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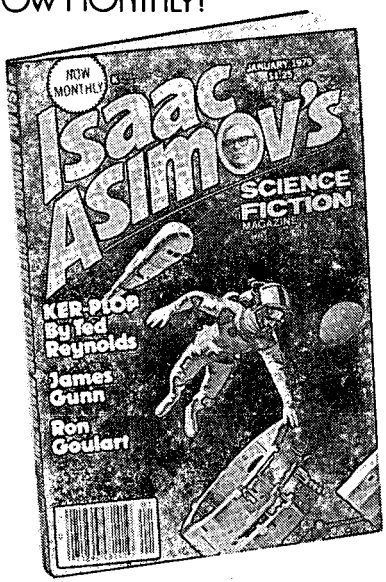

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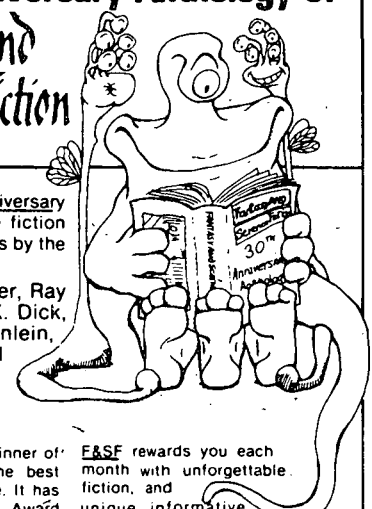

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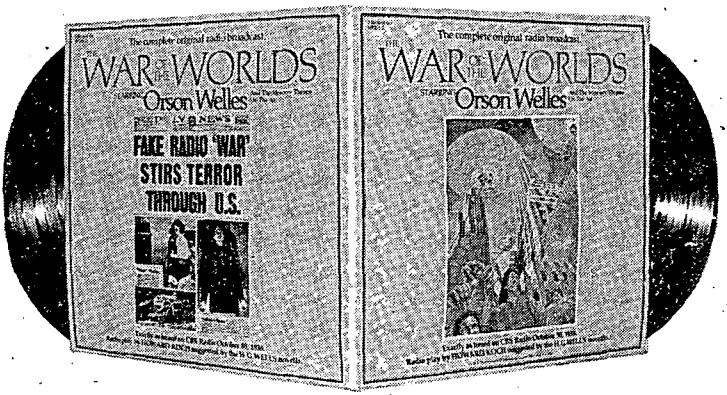

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EDITORIAL: QUITE PERSONAL

art: Frank Kelly Freas

This is the second monthly issue of *Isaac Asimov's Science Fiction Magazine.* Progress has been most satisfactory. In 1977, the first year of the magazine's existence, we had four quarterly issues; in 1978, we had six bimonthly issues. Now, in 1979, we expect to have twelve monthly issues.

Naturally, I cannot assure you that things will continue to go well forever. Who knows what hidden bogs and gopher-holes lie ahead, and it is not characteristic of me to make inflated promises. In fact, those of you who read my editorial in the first issue will remember that I was cautious to begin with and promised nothing more than that we would do our best.

George Scithers, our Industrious Editor, is not as surprised as I am; and Joel Davis, our Keen Publisher, is not surprised at all. He predicted from the start that this would happen and was willing to back up that prediction with a sizable initial investment (which, I am glad to say, he has not lost).

Where I made my own mistake, apparently, was in the nervousness with which I approached the name of the magazine. I was certain that to give a magazine the name of *any* writer would rouse reader hostility, but Joel was sure it would not.

The readers, in fact, seem to have taken the name in very good humor. Some, to be sure, have expressed displeasure over the fact that my personality seems so overwhelmingly present and that I engage so readily in a "soft sell" of the magazine—but that is all of a piece with what I call my "cheerful self-appreciation" and I don't intend to change. Actually, the vast majority of readers (judging at least from the letters we get) feel comfortable with the strongly personal note with which I imbue these editorials, and I'm delighted they do. After all, I was a science fiction reader long before I became an elderly sage, and the habit of considering myself one of you and of speaking with you on that basis is too firmly entrenched for me to break.

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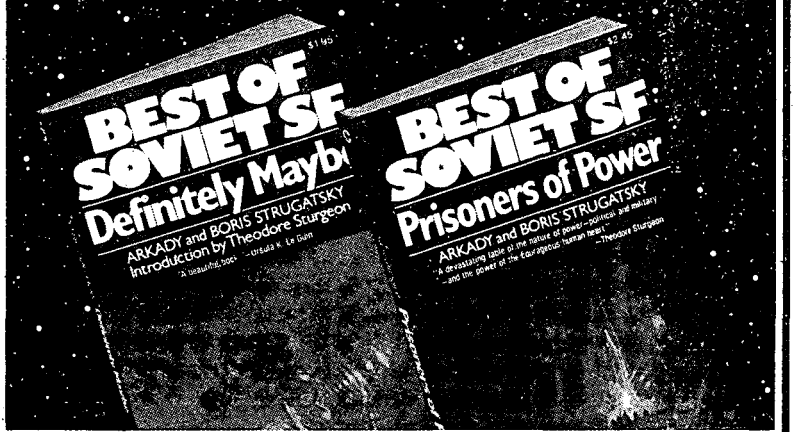

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The fact of my name in the title of the magazine and the strongly personal note encourage the readers to develop a friendly interest in me as a person, of course, and to ask me personal questions.

That is fine; I have no objection to that. In fact, I will gladly answer such questions except where I am forced to cower under the Fifth Amendment for protection from the necessity of self-incrimination. Since it is not always possible to answer you individually, I will, if the question seems of sufficient interest, occasionally devote a portion of the editorial to an answer.

For instance, I am frequently asked all sorts of details about my early life—how I became interested in science fiction, when I wrote my first science fiction story, how many rejections I collected en route to becoming an apprentice sage, and so on, and so on.

No, I'm not going to answer those questions in boring detail here, but I *am* going to plug a forthcoming book of mine.

Back in early 1977, Cathleen Jordan, my beautiful editor at Doubleday, suggested I write an Important Book for the house to celebrate the fact that the number of my books was approaching the magic figure of 200. I said, jokingly, "How about my autobiography?" and Cathleen caught fire at once.

All protests to the effect that I had been kidding were brushed aside, and I was ordered to go home and start typing. I went off, wailing, "But nothing has ever happened to me."

I began work on March 9, 1977, and discovered several astonishing things in due time: 1) I was dealing with a subject that was near and dear to my heart—myself. 2) My memory, which is rather extraordinary, enabled me to dredge up innumerable details concerning my life, all of which were (to myself) fascinating. 3) Beginning with my eighteenth birthday, I had kept a diary which I have never abandoned, so that I had a perfect way of checking the chronology of events and of not overlooking even one of them.

Naturally, then, I kept on going for page after page after page. I didn't even stop on the occasion of my coronary since my wife, Janet, brought to the hospital all that I had written up to that point; and I went over it, editing it.

On December 31, 1977, I was finished but found myself in great distress. The manuscript was 640,000 words long. There was no way of getting it all into a book, and I was sure that Cathleen was going to tell me to cut it in half, and I was sure that I was

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going to refuse and that there'd be the devil to pay.

When I brought it in, Cathleen stared at the four bulging boxes of original and four of carbon and said, in horror, "How much would you have written if anything had ever happened to you?"

She then consulted her boss, Sam Vaughan, hoping to get him to take the responsibility of telling me to cut it in half; but he didn't feel like taking the chance, either. He waved his hand negligently and said, "Oh, heck! Do it in two volumes!"

So that's how it will be. Two fat volumes, each one a third longer than the entire *Foundation Trilogy,* will be published in 1979. The first volume, entitled *In Memory Yet Green,* will be out in February; and on the same day, I hope, Houghton-Mifflin will publish my book, *Opus 200*; and they will share honors as my 200th book.

Do you see what this means? Any of you who are filled with a natural curiosity concerning the kind of youngster I was, what inspired me to take the path in life that I did, how I managed (extraordinarily slowly) to climb the path, partway, to my present position as minor celebrity can find it all in this book in painstaking detail. —And it is all written just as personally as these editorials are.

Of course, the first volume only carries my life forward to when I was a little over thirty. If, then, having read the book, you are curious as to how I managed to continue (with the same extraordinary slowness) the climb the rest of the way to minor celebrity-hood, you need but wait for the second volume, which will take up all those subsequent years during which, by heroic efforts, I managed to remain a little over thirty.

The second volume, which I presume will be published in the fall, is to be entitled *In Joy Still Felt*; and I guess you might as well get them both. I won't conceal from you the fact that it will be an expensive purchase and may necessitate your going on short rations for a week or two, but buying the volumes will please me and surely that will be worth the temporary semi-famine.

Of course, the autobiography only covers my life through 1977, and things have happened since then. The most exciting personal event of 1978 (from the science fiction standpoint) is that, after eight years of steadily-renewed options, my book, *I, Robot,* has been bought by the movies.

None other than Harlan Ellison has been engaged to write the screenplay, and that is a perfect choice. He has the strongly

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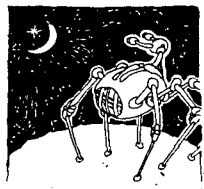
visual imagination that I lack and the Hollywood savvy that I'll never have. As I write this, he has just finished the screenplay. I've read it and I like it enormously. Except for occasional, strictly scientific advice, I have kept my hands off and given Harlan complete freedom.

Now if he can convince the producers that the screenplay does not need to be butchered, and if they decide to invest the money required to do it right (both of them big ifs), then maybe I'll finally have a motion picture after a while.

As to how it would then do at the box-office—well, who knows? As usual, I make no glowing promises.

—Isaac Asimov



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ON RECORDS
by Karl M. Olsen

Mr. Brown's column, "On Books," will be back next month. Meanwhile, here's a discussion on a related topic.

The first stories in the world were fantasies: nature myths that explained the origins of things and the workings of the universe. These stories were spoken aloud by their authors. The village storyteller, who was also its historian, carried his tales in his head and transmitted them by performance. He had no other way. Only later would come writing, later still a sufficient spread of literacy to make the *writing* of stories a useful occupation.

Poets and authors have continued to give public readings, but these have been accessible only to those who could attend them. Now, with sound reproduction by disc and tape available to all, anyone may attend a performance of a fantasy or science fiction story read by a professional actor, or—in the oldest form of all—by the original author.

Spoken-word recordings are not new, but until quite recently they were found primarily in schools. The works of Poe and Hawthorne have been available for many years on records, read by such actors as Basil Rathbone. As teachers of English discovered fantasy writers like H.P. Lovecraft, recordings of their work became available, but again were not widely known in the mass marketplace.

In the early 1960s a small and (then) successful jazz label, Prestige Records, decided to enter the spoken-word field. Among the first releases on the Prestige Lively Arts series, long since collectors' items, was a recording of Burgess Meredith reading some of Ray Bradbury's stories. This album was not a commercial success.

Caedmon Records is the leader in the spoken word field today. In 1969 they released, without fanfare, a recording by an Oxford professor named J.R.R. Tolkein. The album, "Poems and Songs of Middle Earth," became a runaway bestseller and to this day has sold over 100,000 copies. The guiding spirit and director of most Caedmon SF and fantasy recordings is Ward Botsford, a persona-

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ble, articulate, and knowledgeable man who also happens to be a true SF and fantasy fan.

Another company, Alternate World Recordings, has released a series of high-quality spoken-word albums. The brainchild of Roy Torgeson, producer, and Shelley Torgeson, director, AWR has recorded Harlan Ellison, Robert Bloch, Ursula K. LeGuin, Theodore Sturgeon, Joanna Russ, and other well-known authors reading their own writings.

For Caedmon, Frank Herbert has recorded "Dune, The Banquet Scene," the first of a planned four *Dune* albums. "The Banquet Scene," an excerpt from the first *Dune* novel, is read beautifully and forcefully by Mr. Herbert.

The second *Dune* release, titled "Sandworms of Dune," contains new connective material, and could be considered as a separate and new entry in the *Dune* cycle. The third album, to appear soon, will be "Battles of Dune" the fourth, tentatively titled "The Books of Dune," is to be a reading of the chapter epigraphs—the excerpts from Princess Irulan's *History,* the *Bene Gesserit Manual,* et cetera—from all the books. Caedmon plans to ultimately issue all four albums in a special boxed set, with extensive notes and a color map of Arrakis.

Dr. Isaac Asimov's *Foundation* series is represented by two recordings so far. On the first of these, William Shatner reads "The Psychohistorians," the first segment of *Foundation,* the first volume of the trilogy. This recording makes use of echo and electronic sound effects. It is a matter of taste whether these enhance the reading or distract the listener.

The second *Foundation* record is by the Good Doctor himself. Dr. Asimov gives a vigorous reading of "The Mayors," the third segment of *Foundation.* This recording is similar in format to the Shatner album, also making use of electronic effects, and is in the reviewer's opinion the more successful of the two. More sections of *Foundation* are to be recorded in the future.

Not strictly a spoken-word recording but worthy of mention is Analog Records' dramatization of Asimov's "Nightfall," one of the best-known stories in all of science fiction. This record brings back memories of the "X Minus One" and "Dimension X" radio programs of the fifties, making use of a full cast of actors and complete background sound effects. Also on the album is a conversation between Ben Bova (editor of *Analog* at the time) and Dr. Asimov, regarding the writing of "Nightfall," which offers many insights into a writer's conceptual and creative process, as

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well as the remarkable influence of John W. Campbell on science fiction.

Arthur C. Clarke has made two recordings for Caedmon, with more projected. Currently available is a reading of the final chapters of *2001: A Space Odyssey*—naturally including the World Riddle Theme from *Thus Spake Zarathustra*. A second album includes some of Clarke's best-known short stories: "Transit of Earth," "The Star," and "The Nine Billion Names of God." Forthcoming Clarke albums will include excerpts from *Childhood's End* and from an as-yet-unpublished novel, the latter to be released simultaneously with the book.

Alternate World Recordings was the first to recognize Ursula K. LeGuin's reading talents. She has recorded for them "The Ones Who Walk Away From Omelas," "Direction of the Road," and an excerpt from *The Left Hand of Darkness*. Her rendering is clear and straightforward. The attractive jacket artwork, illustrating "Omelas," is by George Barr.

Another fine recording has been made by Ms. LeGuin for Caedmon Records. The longer of the two stories on this album is the *Star Trek* parody "Intracom." Heard on this cute and sometimes very funny reading are Captain Cook, Mr. Balls, Bolts, the insane Second Mate Bats, Sparks, and an alien, with all six voices provided by Ms. LeGuin, who shows a genuine gift for character mannerism. The other selection is "Gwilan's Harp," a serious story seriously read. Jacket art is by Kelly Freas (as are most of Caedmon's SF album covers).

Theodore Sturgeon also has two LPs to his credit, one for Caedmon and the other for AWR. For Caedmon, Mr. Sturgeon reads an abridged version of "Baby is Three," from his celebrated novel *More than Human*. This reading, over an hour long, is clear and unadorned.

Sturgeon's recording for the Torgesons is another matter entirely. This is a vibrant and enthusiastic Ted Sturgeon, obviously in complete control of his delivery. The stories are "Bianca's Hands," startling and compelling, and "The Hurkle is a Happy Beast," which bounces nonstop to its end. Mr. Sturgeon begins each story with a brief but welcome introduction. The jacket art is excellent: a portrait of Sturgeon by Ed Emshwiller originally painted for the special Sturgeon issue of *The Magazine of Fantasy and Science Fiction*.

Also for Alternate World, Joanna Russ has recorded her Nebula Award winner "When It Changed," "The Great Happiness Con-

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test," "Gleepsite," and a short excerpt from her novel *The Female Man*. Ms. Russ's reading voice is excellent, her feeling for the stories clearly conveyed to the listener. "When It Changed" is the outstanding item on the record; it is the story of an extraterrestrial colony, typical except for one thing: all the male colonists have been dead for six hundred years. The outpost on Whileaway must continue with females only, and does so in fine fashion. In time, men from Old Earth arrive—to collide with a stable and efficient family and government structure that requires no males or male surrogates. This album is also highly recommended, but the cover and liner notes are not up to AWR's usual high standards.

"Harlan! or, Ellison Reads Ellison" is a recording with energy and vitality—how, indeed, could it be otherwise? The Alternate World record contains "Repent, Harlequin! Said the Ticktockman," the widely reprinted tale of the Master Timekeeper and the man with no sense of time, and "Shatterday," the story of a man who accidentally dials his own telephone number—and hears himself answer!

The Ellison voice and manner require a few moments to adjust to, but the resulting experience is worth the very small effort required. Subtle sound effects do not distract the listener. Liner notes draw an excellent picture of Harlan Ellison. This album was nominated for a Nebula Award and has proven to be the biggest seller in the AWR catalog.

Leonard Nimoy has recorded the works of Ray Bradbury, H.G. Wells, and Robert A. Heinlein on four albums for Ca[illegible]. One Bradbury disc features "There Will Come Soft Rains" and "Usher II" from *The Martian Chronicles*. "Soft Rains" pictures a fully-automated home whose inhabitants have been destroyed, proceeding slowly and quietly toward its own inevitable end. "Usher II" is a literary fantasy of the re-creation of the House of Usher, on Mars in the 21st century.

The second Bradbury LP contains "The Veldt" and "Marionettes, Inc." from *The Illustrated Man*. Nimoy's reading of these stories captures the delicate rhythm of Bradbury's prose. The cover art is poorer than usual, however. Liner notes, by Sandra Ley, are acceptable but brief.

The Nimoy/Heinlein recording has an outstanding jacket by Kelly Freas, and excellent liner notes by Mr. Heinlein and Ward Botsford of Caedmon. The stories presented include "The Green Hills of Earth," the story of Rhysling the starfaring folksinger, an SF classic which gains even more dimension in dramatic reading.

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The less-well-known "Gentlemen, Be Seated" is based on the old Dutch legend of the boy and the hole in the dike. This time, the leak is in a lunar-colony tunnel and requires more than a finger to plug it.

H.G. Wells's *The War of The Worlds* is abridged to a reading time of about fifty minutes. This version is highly listenable and has been overlooked by many, which is unfortunate. There is an excellent jacket painting by Rick Sternbach (who also illustrated the two *Foundation* albums) and more-than-adequate liner notes.

William Shatner reads Henry Kuttner's 1943 story "Mimsy Were the Borogoves" for Caedmon. Shatner does voice characterizations for much of the cast; he is especially good with the voices of the children who discover a toy dropped into our world from . . . somewhere else. The cover painting, by Kelly Freas, is absolutely stunning. The liner notes are by Catherine L. Moore (Mrs. Kuttner) and are quite naturally authoritative.

Alternate World has released a remarkable two-record set: "Blood! The Life and Future Times of Jack the Ripper." In three stories, two by Robert Bloch and one by Harlan Ellison, the set traces the past and future career of the Whitechapel killer. The Bloch stories are "Yours Truly, Jack the Ripper," from *Weird Tales* magazine of 1943, and "A Toy for Juliette," from the 1967 anthology *Dangerous Visions*. Robert Bloch is no stranger to radio drama, and his renditions provide a stimulating exercise for the imagination.

The Ellison story, "The Prowler in the City at the Edge of the World," (also from *Dangerous Visions*) begins where Bloch's "Juliette" ends. Ellison's reading must be considered one of the best vocal dramatizations ever done in this field. Echo and reverberation effects are used, but sparingly; and Mr. Ellison reads his characters in unique ways. He even slips in a Ronald Colman voice for a major character, to good effect. A truly incredible *tour de force* for authors and listener, this album set may be the best and most vivid done in SF/fantasy to date. The liner notes are quite good, and the cover, mostly in shades of red, grabs the attention.

Robert Bloch is also represented on the AWR label by "Gravely, Robert Bloch." On this record the author reads "That Hell-Bound Train," a light fantasy which was awarded the Hugo as the best SF short story of 1958, and "Enoch," from *Weird Tales* of 1946. Cartoonist Gahan Wilson has provided a cover illustration of Robert Bloch and friends; the liner notes are by Lester del Rey.

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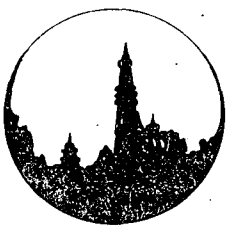
There is quite a bit to look forward to in SF recordings. In the planning stages or awaiting release are· Anne McCaffrey reading *The White Dragon;* Clifford D. Simak reading excerpts from *City;* Robert Silverberg reading from *Dying Inside;* and a special album by Poul Anderson, called "Yonder," about man in space from the first explorations to 6,000 years in the future. Also planned are Judith Merril's "Survival Ship," Hal Clement's *Needle,* Ted Sturgeon's "The Fabulous Idiot," and a dramatic reading of John W. Campbell's "Who Goes There?"

The buying public has shown a great interest in SF spoken-word recordings, and more and more authors have responded by recording their work not only for the immediate audience but for future listeners. The finest storytellers in SF and fantasy are once again speaking their stories as well. Have you heard; are you listening?



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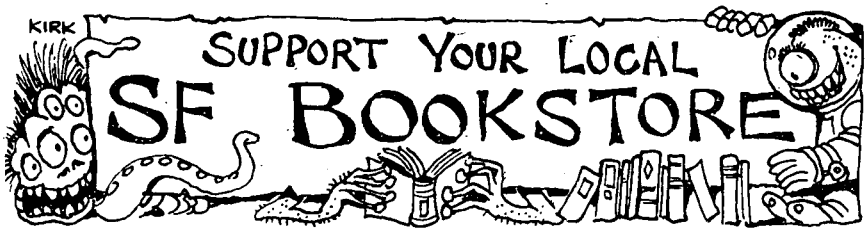

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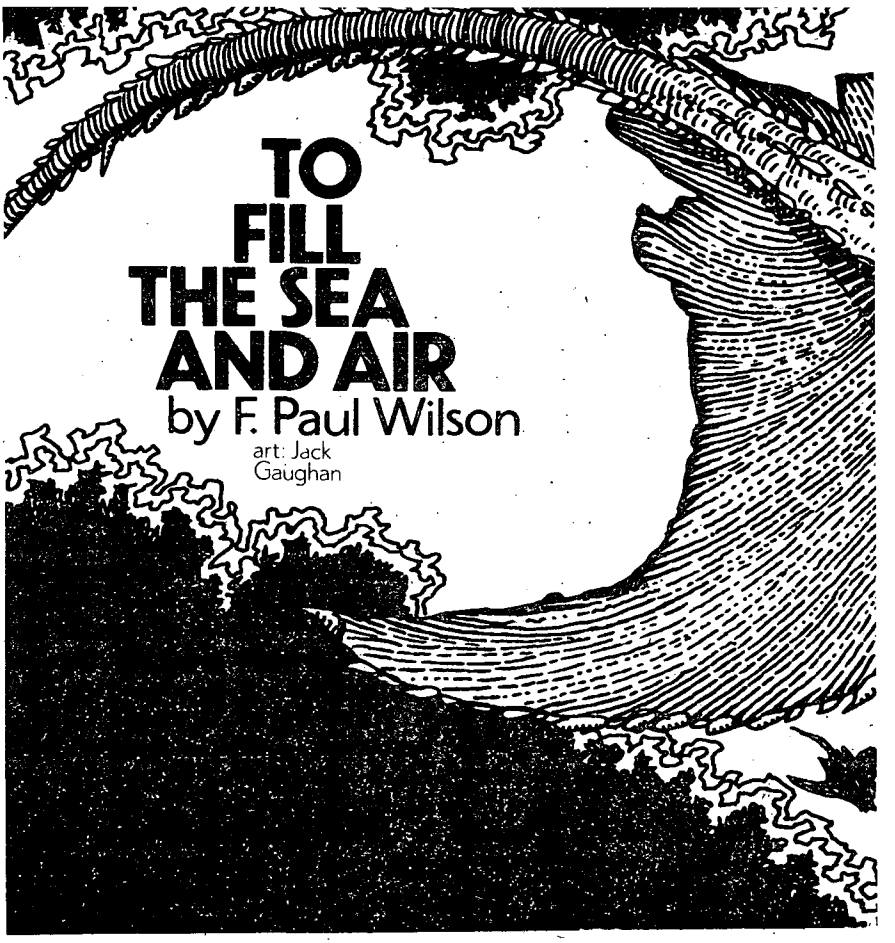

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During the period in question there were two items on the interstellar market for which supply could never equal demand. The intricate, gossamer carvings of the Vanek were one, valued because they were so subtly alien and yet so appreciable on human terms. The other was filet of chispen, a seafood delicacy with gourmet appeal all across Occupied Space. The flavor . . . how does one describe a unique gustatorial experience, or the mild euphoria that attends consumption of sixty grams or more of the filet?

Enough to say that it was in high demand in those days. And the supply rested completely on the efforts of the individual chispen fishers on Gelk. Many a large interstellar corporation pressed to bring modern methods to the tiny planet for a more efficient harvesting of the fish, but the ruling council of Gelk forbade the intrusion of outside interests. There was a huge profit to be made and the council members intended to see that the bulk of it went into their own pockets.

from *STARS FOR SALE:*
An Economic History of Occupied Space
by Emmerz Fent.

Imagine the sea, smooth slate gray in predawn under a low drifting carapace of cloud. Imagine two high, impenetrable walls parallel on that sea, separated by ten times the height of a tall man, each stretching away to the horizon. Imagine a force-seven gale trapped between those walls and careening toward you, beating the sea below it to a furious lather as it comes.

Now . . . remove the walls and remove the wind. Leave the onrushing corridor of turbulent water. That was what Albie saw as he stood in the first boat.

The chispies were running. The game was on.

Albie gauged it to be a small school, probably a spur off a bigger run to the east. Good. He didn't want to hit a big run just yet. There were new men on the nets who needed blooding and a small school like the one approaching was perfect.

He signaled to his men at their posts around the net, warning them to brace for the hit. Out toward the sun stood a long dark hull, bristling amidships with monitoring equipment. Albie knew he was being watched but couldn't guess why. He didn't recognize the design and closed his right eye to get a better look with his left. The doctors had told him not to do that. If he had to favor one of his eyes, let it be the artificial one. But he couldn't get

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used to it—everything always looked grainy, despite the fact that it was the best money could buy. At least he could see. And if he ever decided on a plastic repair of the ragged scar running across his right eyebrow and orbit, only old friends would know that a chispie wing had ruined that eye. And, of course, Albie would know. He bore the chispies no animosity, though. No Ahab syndrome for Albie. He was glad to be alive, glad to lose an eye instead of his head. There were no prosthetic heads around.

Most of the experienced men on the nets wore scars or were missing bits of ears or fingers. It was part of the game. If they didn't want to play, they could stand on shore and let the chispies swim by unmolested. That way they'd never get hurt. Nor would they get those exorbitant prices people all over Occupied Space were willing to pay for filet of chispen.

Turning away from the dark, skulking hull, Albie trained both eyes on the chispies. He leaned on the wheel and felt the old tingling in his nerve ends as the school approached. The middle of his sixth decade was passing, the last four of them spent on this sea as a chispen fisher . . . and still the same old thrill when he saw them coming.

He was shorter than most of the men he employed; stronger, too. His compact, muscular body was a bit flabbier now than usual, but he'd be back to fighting trim before the season was much older. Standing straight out from his cheeks, chin, and scalp was a knotty mane of white and silver shot through with streaks of black. He had a broad, flat nose, and the skin of his face, what little could be seen, showed the ravages of his profession. Years of long exposure to light from a star not meant to shine on human skin, light refracted down through the atmosphere and reflected up from the water, had left his dark brown skin with a texture similar to the soles of a barefoot reefclimber, and lined it to an extent that he appeared to have fallen asleep under the needle of a crazed tattooist with a penchant for black ink and a compulsion for crosshatching. Eyes of a startling gray shone out from his face like beacons in the night.

The stripe of frothing, raging water was closer now. Albie judged it to be about twenty meters across, so he let his scow drift westward to open the mouth of the net a little wider. Thirty meters seaward to his right lay the anchorboat manned by Lars Zaro, the only man in the crew older than Albie. The floats on the net trailed in a giant semi-circle between and behind them, a cul-de-sac ringed with ten scows of Albie's own design—flat-bottomed

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with a centerboard for greater stability—each carrying one gaff man and one freezer man. The two new hands were on freezer duty, of course. They had a long way to go before they could be trusted with a gaff.

Albie checked the men's positions—all twenty-six, counting himself, were set. Then he glanced again at the big ship standing out toward the horizon. He could vaguely make out *GelkCo I* emblazoned across the stern. He wondered why it was there.

"Incredible! That school's heading right for him!"

"Told you."

Two men huddled before an illuminated screen in a dark room, one seated, the other leaning over his shoulder, both watching the progress of the season's first chispen run. The main body of the run was a fat, jumbled streak of light to the right of center on the screen, marking its position to seaward in the deeper part of the trench. They ignored that. It was the slim arc that had broken from the run a few kilometers northward and was now heading directly for a dot representing Albie and his crew that gripped their attention.

"How does he do it?" the seated man asked. "How does he know where they're going to be?"

"You've just asked the question we'd all like answered. Albie uses outdated methods, decrepit equipment, and catches more than anyone else on the water. The average chispen fisher brings home enough to support himself and his family; Albie is rich and the two dozen or so who work for him are living high."

"Well, we'll be putting an end to that soon enough, I guess."

"I suppose we will."

"It's almost a shame." The seated man pointed to the screen. "Just look at that! The school's almost in his net! Damn! It's amazing! There's got to be a method to it!"

"There is. And after seeing this, I'm pretty sure I know what it is." But the standing man would say no more.

Albie returned his attention to the onrushing school, mentally submerging and imagining himself as one with the chispies: He saw glistening blue-white fusiform shapes darting through the water around him in tightly packed formation just below the surface. Their appearance at this point differed markedly from the slow, graceful, ray-like creatures that glide so

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peacefully along the seabottoms of their winter spawning grounds to the south or the summer feeding grounds to the north. With their triangular wings spread wide and gently undulating, the chispies are the picture of tranquility at the extremes of their habitat.

But between those extremes . . .

When fall comes after a summer of gorging at the northern shoals, the chispen wraps its barbed wings around its fattened body and becomes a living, twisting missile hurtling down the twelve-hundred-kilometer trench that runs along the coast of Gelk's major land mass.

The wings stay folded around the body during the entire trip. But should something bar the chispies' path—a net, for instance—the wings unfurl as they swerve and turn and loop in sudden trapped confusion. The ones who can build sufficient momentum break the surface and take to the air in a short glide to the open sea. The chispen fisher earns his hazard pay then—the sharp barbed edges of those unfurled wings cut through flesh almost as easily as air.

With the school almost upon him, Albie turned his attention to the net floats and waited. Soon it came: a sudden erratic bobbing along the far edge of the semi-circle. There were always a few chispies traveling well ahead of their fellows and these were now in the net. Time to move.

"Everybody hold!" he yelled and started moving his throttle forward. He had to establish some momentum before the main body of the school hit, or else he'd never get the net closed in time.

As the white water speared into the pocket of net and boats, Albie threw the impeller control onto full forward and gripped the wheel with an intensity that bulged the muscles of his forearms.

The hit came, tugging his head back and causing the impeller to howl in protest against the sudden reverse pull. As Albie turned his boat hard to starboard and headed for Zaro's anchorboat to complete the circle, the water within began to foam like green tea in a blender. He was tying up to Zaro's craft when the first chispies began breaking water and zooming overhead. But the circumscribed area was too small to allow many of them to get away like that. Only those who managed to dart unimpeded from the deep to the surface could take to the air. The rest thrashed and flailed their wings with furious intensity, caroming

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off the fibrous mesh of the net and colliding with each other as the gaffers bent to their work.

The game was on.

The boats rocked in the growing turbulence and this was when the men appreciated the added stability of centerboards on the flatbottomed scows. Their helmets would protect their heads, the safety wires gave them reasonable protection against being pulled into the water, but if a boat capsized . . . any man going into that bath of sharp swirling seawings would be ribbon-meat before he could draw a second breath.

Albie finished securing his boat to Zaro's, then grabbed his gaff and stood erect. He didn't bother with a helmet, depending rather on forty years of experience to keep his head out of the way of airborne chispies, but made sure his safety wire was tightly clipped to the back of his belt before leaning over the water to put his gaff to work.

There was an art to the gaffing, a dynamic synthesis of speed, skill, strength, courage, agility and hand-eye coordination that took years to master. The hook at the end of the long pole had to be driven under the scales with a cephalad thrust at a point forward of the chispen's center of gravity. Then the creature's momentum had to be adjusted—*never* countered—into a rising arc that would allow the gaff-handler to lever it out of the water and onto the deck of his scow. The freezer man—Zaro in Albie's case—would take it from there, using hand hooks to slide the flopping fish onto the belt that would run it through the liquid nitrogen bath and into the insulated hold below.

Albie worked steadily, rhythmically, his eyes methodically picking out the shooting shapes, gauging speed and size. The latter was especially important: too large a fish and the pole would either break or be torn from his hands; too small and it wasn't worth the time and effort. The best size was in the neighborhood of fifty kilos—about the weight of a pubescent human. The meat then had body and tenderness and brought the highest price.

Wings slashed, water splashed, droplets flashed through the air and caught in Albie's beard. Time was short. They had to pull in as many as they could before the inevitable happened. Insert the hook, feel the pull, lever the pole, taste the spray as the winged beastie angrily flapped the air on its way to the deck, free the hook and go back for the next. It was the first time all year Albie had truly felt alive.

Then it happened as it always happened: the furious battering

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opened a weak spot in the net and the school leaked free into the sea. That, too, was part of the game. After a moment of breath-catching, the men hauled in the remains of the net to pick up the left-overs, the chispies too battered and bloodied by their confused and frantic companions to swim after them.

"Look at that, will you?" the seated man said. "They broke out and now they're heading back to the main body of the run! How do you explain that?" The standing man said nothing and the seated one looked up at him. "You used to work for Albie, didn't you?"

A nod in the dimness. "Once. Years ago. That was before I connected with GelkCo."

"Why don't you pay him a visit? Never know . . . he might come in handy."

"I might do that—if he'll speak to me."

"Oh? He get mad when you quit?"

"Didn't quit. The old boy fired me."

"Hello, Albie."

Albie looked up from where he sat on the sand in a circle of his men, each with a pile of tattered net on his lap. The sun was lowering toward the land and the newcomer was silhouetted against it, his features in shadow. But Albie recognized him.

"Vic? That you, Vic?"

"Yeah, Albie, it's me. Mind if I sit down?"

"Go ahead. Sand's free." Albie gave the younger man a careful inspection as he made himself comfortable. Vic had been raised a beach rat but that was hard to tell now. A tall man in his mid-thirties, he was sleek, slim, and dark with blue eyes and even features. The one-piece suit he wore didn't belong on the beach. His black hair was slicked back, exposing a right ear bereft of its upper third, a physical trait acquired during his last year on the chispen nets. Restoration would have been no problem had he desired it, but apparently he preferred to flaunt the disfigurement as a badge of sorts. It seemed to Albie that he had broken Vic in on the nets only a few days ago, and had sacked him only yesterday. But it had been years . . . eleven of them.

He tossed Vic a length of twine. "Here. Make yourself useful. Can I trust you to do it right?"

"You never let a man forget, do you?" Vic said through an uncertain smile.

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"That's because *I* don't forget!" Albie knew there was a sharp edge on his voice; he refused to blunt it with a smile of his own.

The other men glanced at each other, frowning. Albie's mellow temperament was legend among the fishermen up and down the coast, yet here he was, glowering and suffusing the air with palpable tension. Only Zaro knew what lay behind the animosity.

"Time for a break, boys," Zaro said. "We'll down a couple of ales and finish up later."

Albie never allowed dull-witted men out on the nets with him: they took the hint and walked off.

"What brings you back?" he asked when they were alone.

"That." Vic pointed toward the ship on the horizon.

Albie kept his eyes down, concentrating on repairing the net. "Saw it this morning. What's *GelkCo I* mean?"

"She's owned by the GelkCo Corporation."

"So they call it *GelkCo I*? How imaginative."

Vic shrugged and began patching a small hole in the net before him, his expression registering surprise and pleasure with the realization that his hands still knew what to do.

"The Council of Advisors put GelkCo together so the planet could deal on the interstellar market as a corporation."

"Since when do you work for the C. of A.?"

"Since my fishing career came to an abrupt halt eleven years ago." His eyes sought Albie's but couldn't find them. "I went into civil service then. Been on a research and development panel for the Council."

"Civil service, eh?" Albie squinted against the reddening light. "So now you get taxes put *into* your pay instead of taken out."

Vic was visibly stung by the remark. "Not fair, Albie. I earn my pay."

"And what's this corporation supposed to sell?" Albie said, ignoring the protest.

"Filet of chispen."

Albie smiled for the first time. "Oh, really? You mean they've still got chispies on their minds?"

"That's *all* they've got on their minds! And since I spent a good number of years with the best chispen fisher there is, it seemed natural that I be put in charge of developing the chispen as a major export."

"And that ship's going to do it?"

"It has to!" Vic said emphatically. "It must. Everything else was tried before they came to me—"

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"They came to me first."

"I know." Vic could not suppress a smile. "And your suggestions were recorded as not only obscene, but physically impossible as well!"

"That's because they really aren't interested in anything about those fish beyond the price per kilo."

"Perhaps you're right, Albie. But that boat out there is unique and it's going to make you obsolete. You won't get hurt financially, I know. You could've retired years ago . . . and should have. Your methods have seen their day. That ship's going to bring this industry up to date."

"Obsolete!" The word escaped behind a grunt of disgust. Albie seriously doubted the C. of A.'s ability to render anything obsolete. . . . except maybe efficiency and clear thinking. For the past few years he had been keeping a careful eye on the Council's abortive probes into the chispen industry, had watched with amusement as it tried every means imaginable to obtain a large supply of chispen filet short of actually going out and catching the fish.

The chispies, of course, refused to cooperate, persisting in migratory habits that strictly limited their availability. They spawned in the southern gulf during the winter and fattened themselves on the northern feeding shoals during the summer, and were too widely dispersed at those two locales to be caught in any significant numbers. Every spring they grouped and ran north but were too lean and fibrous from a winter of mating, fertilizing and hatching their eggs.

Only in the fall, after a full summer of feasting on the abundant bait fish and bottom weed indigenous to their feeding grounds, were they right for eating, and grouped enough to make it commercially feasible to go after them. But Gelk's Council of Advisors was convinced there existed an easier way to obtain the filet than casting nets on the water. It decided to raise chispen just like any other feed animal. But chispies are stubborn. They won't breed in captivity, nor will they feed in captivity. This held true not only for adult fish captured in the wild, but for eggs hatched and raised in captivity, and even for chispen clones.

The Council moved on to tissue cultures of the filet but the resultant meat was said to be nauseating.

It eventually became evident to even the most dunderheaded member of the Council that there weren't going to be any shortcuts here. The appeal of chispen filet was the culmination of

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myriad environmental factors: the semi-annual runs along the coast gave the meat body and texture; the temperature, water quality, and bottom weed found only on their traditional feeding shoals gave it the unique euphorogenic flavor that made it such a delicacy.

No, there was only one way to supply the discriminating palates of Occupied Space with filet of chispen, and that was to go out on the sea and catch them during the fall runs. They had to be pulled out of the sea and flash-frozen alive before an intestinal enzyme washed a foul odor into the bloodstream and ruined the meat. No shortcuts. No easy way out.

"I didn't come to gloat, Albie. And I mean you no ill will. In fact, I may be able to offer you a job."

"And how could a lowly old gaffer help out on a monstrosity like that?" He turned back to his net repair.

"By bringing fish into it."

Albie glanced up briefly, then down again. He said nothing.

"You can't fool me, Albie. Maybe all the rest, but not me. I used to watch you . . . used to see you talking to those fish, bringing them right into the net."

"You think I'm a psi or something?" The voice had laughter all around the edges.

"I *know* it! And what I saw on the tracking screen this morning proves it!"

"Crazy."

"No. You're a psi! Maybe you don't even know it, but you've got some sort of influence over those fish. You call them somehow and they come running. That's why you're the best."

"You'll never understand, will you. It's—"

"But I do understand! You're a psi who talks to fish!"

Albie's dark lids eclipsed his eyes until only slim crescents of light gray remained.

"Then why," he said in a low voice, "did I have such a rotten season eleven years ago? Why did I have to fire the best first mate I ever had? If I'm a psi, why couldn't I call the chispies into the net that season? Why?"

Vic was silent, keeping his eyes focused on the dark ship off shore. As he waited for an answer, Albie was pulled pastward to the last time the two of them had spoken.

It had been Albie's worst season since he began playing the game. After an excellent start, the numbers of chispen flowing into the freezers had declined steadily through the fall until that

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one day at season's end when they sat in their boats and watched the final schools race by, free and out of reach.

That was the day Albie hauled in the net out there on the water and personally gave it a close inspection, actually cutting off samples of net twine and unraveling them. What he found within sent him into a rage.

The first mate, a young man named Vic who was wearing a bandage on his right ear, admitted to replacing the usual twine with fiber-wrapped wire. As Albie approached him in a menacing half-crouch, he explained quickly that he thought too many fish had been getting away. He figured the daily yield could be doubled if they reinforced the net with something stronger than plain twine. He knew Albie had only one hard and fast rule among his crew and that was to repair the net exclusively with the materials Albie provided—no exceptions. So Vic opted for stealth, intending to reveal his ploy at season's end when they were all richer from the extra fish they had caught.

Albie threw Vic into the sea that day and made him swim home. Then he cut the floats off the net and let it sink to the bottom. Since that day he had made a practice of being present whenever the net was repaired.

A long time passed before Albie started feeling like himself again. Vic had been in his crew for six years. Albie had taken him on as a nineteen-year-old boy and had watched him mature to a man on the nets. He was a natural. Raised along the coast and as much at home on the sea at he was on land, he was soon a consummate gaffer and quickly rose to be the youngest first mate Albie had ever had. He watched over Vic, worried about him, bled with him when a chispie wing took a piece of his ear, and seriously considered taking him in as a partner after a few more years. Childless after a lifelong marriage to the sea, Albie felt he had found a son in Vic.

And so it was with the anger of a parent betrayed by one of his own that Albie banished Vic from his boats. He had lived with the anguish of that day ever since.

"There's lots of things I can't explain about that season," Vic said. "But I still think you're a psi, and maybe you could help turn a big catch into an even bigger one. If you want to play coy, that's your business. But at least come out and see the boat. I had a lot to do with the design."

"What's in this for you, Vic? Money?"

He nodded. "Lots of it. And a place on the Council of Advisors."

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"That's if everything goes according to plan. What if it fails?"

"Then I'm through. But that's not a realistic concern. It's not going to be a question of failure or success, just a question of *how* successful." He turned to Albie. "Coming out tomorrow?"

Albie's curiosity was piqued. He was debating whether or not to let Zaro take charge of the catch tomorrow . . . he'd do an adequate job . . . and it was early in the season . . . . "When?"

"Mid-morning will be allright. The scanners have picked up a good-sized run up at the shoals. It's on its way down and should be here by midday."

"Expect me."

A hundred meters wide and at least three times as long: those were Albie's estimates. The ship was like nothing he had ever seen or imagined . . . a single huge empty container, forty-five or fifty meters deep, tapered at the forward end, and covered over with a heavy wire mesh. Albie and Vic stood in a tiny pod on the port rim that housed the control room and crew quarters.

"And this is supposed to make me obsolete?"

"Afraid so." Vic's nod was slow and deliberate. "She's been ready since spring. We've tested and retested—but without chispies. This'll be her christening, her first blooding." He pointed to the yellow streak creeping down the center of the scanning screen. "And that's going to do it."

Albie noticed a spur off the central streak that appeared to be moving toward a dot at the left edge of the screen.

"My, my!" he said with a dry smile. "Look at those chispies heading for my boats—even without me there to invite them in."

A puzzled expression flitted briefly across Vic's features, then he turned and opened the hatch to the outside.

"Let's go up front. They should be in sight now."

Under a high white sun in a cloudless sky, the two men trod the narrow catwalk forward along the port rim. They stopped at a small observation deck where the hull began to taper to a point. Ahead on the cobalt sea, a swath of angry white water, eighty meters wide, charged unswervingly toward the hollow ship. A good sized run—Albie had seen bigger, but this was certainly a huge load of fish.

"How many of those you figure on catching?"

"Most of them."

Albie's tone was dubious. "I'll believe that when I see it. But let's suppose you do catch most of them—you realize what'll hap-

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pen to the price of filet when you dump that much on the market at once?"

"It will drop, of course," Vic replied. "But only temporarily, and never below a profitable level. Don't worry: the Council has it all programmed. The lower price will act to expand the market by inducing more people to take advantage of the bargain and try it. And once you've tried filet of chispen . . ." He didn't bother to complete the thought.

"Got it all figured out, eh?"

"Down to the last minute detail. When this ship proves itself, we'll start construction on more. By next season there'll be a whole fleet lying in wait for the chispies."

"And what will that kind of harvesting do to them? You'll be thinning them out . . . maybe too much. That's not how the game's played, Vic. We could end up with no chispies at all some day."

"We'll only be taking the bigger ones."

"The little guys need those bigger ones for protection."

Vic held up a hand. "Wait and see. It's almost time." He signaled to the control pod. "Watch."

Water began to rush into the hold as the prow split along its seam and fanned open into a giant scoop-like funnel; the aft panel split vertically down the middle and each half swung out to the rear. The ship, reduced now to a huge open tube with neither prow nor stern, began to sink.

Albie experienced an instant of alarm but refused to show it. All this was obviously part of the process. When the hull was immersed to two-thirds of its depth, the descent stopped.

Vic pointed aft. "There's a heavy metal grid back there to let the immature chispies through. But there'll be no escape for the big ones. In effect, what we're doing here is putting a huge, tear-proof net across the path of a major run, something no one's dared to do before. With the old methods, a run like this would make chowder out of anything that tried to stop it."

"How do you know they won't just go around you?"

"You know as well as I do, Albie, these big runs don't change course for anything. We'll sit here, half-sunk in the water, and they'll run right into the hold there; they'll get caught up against the aft grid, and before they can turn around, the prow will close up tight and they're ours. The mesh on top keeps them from flying out."

Albie noticed Vic visibly puffing with pride as he spoke, and couldn't resist one small puncture: "Looks to me like all you've

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got here is an oversized, motorized seining scoop."

Vic blinked, swallowed, then went on talking after a brief hesitation. "When they're locked in, we start to circulate water through the hold to keep them alive while we head for a plant up the coast where they'll be flash-frozen and processed."

"All you need is some cooperation from the fish."

Vic pointed ahead. "I don't think that'll be a problem. The run's coming right for us."

Albie looked from the bright anticipation in Vic's face to the ship sitting silent and open-mawed, to the onrushing horde of finned fury. He knew what was going to happen next but didn't have the heart to say it. Vic would have to learn for himself.

The stars were beginning to poke through the sky's growing blackness. Only a faint, fading glow on the western horizon remained to mark the sun's passing. None of the moons was rising yet.

With the waves washing over his feet, Albie stood and watched the autumn aurora begin to shimmer over the sea. The cool prevailing breeze carried smoke from his after-dinner pipe away toward the land. Darkness expanded slowly and was almost complete when he heard the voice.

"Why'd you do it, Albie?"

It wasn't necessary to turn around. He knew the voice, but had not anticipated the fury he sensed caged behind it.

"Didn't do a thing, Vic." He kept his eyes on the faint, wavering flashes of the aurora, his own voice calm.

"You diverted those fish!"

"That's what you'd like to believe, I'm sure, but that's not the way it is."

The run had been almost on top of them. The few strays that always travel in the lead had entered the hold and slammed into the grate at the other end. Then the run disappeared. The white water evaporated and the sea became quiet. In a panic, Vic had run back to the control pod where he learned from the scanner that the run had sounded to the bottom of the trench and was only now rising toward the surface . . . half a kilometer aft of the ship. Vic had said nothing, glaring only momentarily at Albie and then secluding himself in his quarters for the rest of the day.

"It's true!" Vic's voice was edging toward a scream. "I watched your lips! You were talking to those fish . . . telling them to dive!"

Albie swung around, alarmed by the slurred tones and growing

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hysteria in the younger man's voice. He could not make out Vic's features in the darkness, but could see the swaying outline of his body. He could also see what appeared to be a length of driftwood dangling from his right hand.

"How much've you had to drink, Vic?"

"Enough." The word was deformed by its extrusion through Vic's clenched teeth. "Enough to know I'm ruined and you're to blame."

"And what's the club for? Gonna break my head?"

"Maybe. If you don't agree to straighten out all the trouble you caused me today, I just might."

"And how do you expect me to do that?"

"By guiding the fish *into* the boat instead of under it."

"Can't do that, Vic." Albie readied himself for a dodge to one side or the other. The Vic he had known on the nets would never swing that club. But eleven years had passed . . . and this Vic was drunk. "Can't do it as I am now, and I sure as hell won't be able to do it any better with a broken head. Sorry."

There followed a long, tense, silent moment. Then two sounds came out of the darkness: one, a human cry—half sob, half scream of rage; followed by the grating thud of wood hurled against wet sand. Albie saw Vic's vague outline slump into a sitting position.

"Dammit, Albie! I trusted you! I brought you out there in good faith and you scuttled me!"

Albie stepped close to Vic and squatted down beside him. He put the bit of his pipe between his teeth. The bowl was cold but he didn't bother relighting it.

"It wasn't me, Vic. It was the game. That ship of yours breaks all the rules of the game."

" 'The game!' " Vic said, head down, bitterness compressing his voice. "You've been talking about games since the day I met you. This is no game, Albie! This is my life . . . my future!"

"But it's a game to the chispies. That's what most people don't understand about them. That's why only a few of us are any good at catching them: those fish are playing a game with us."

Vic lifted his head. "What do you take me for?"

"It's true. Only a few of us have figured it out, and we don't talk it around. Had you stayed with me a few years longer, I might have told you if you hadn't figured it out for yourself by then. Truth is, I'm no psi and I don't direct those fish into my net; they find their way in on their own. If they get caught in my net, it's because they *want* to."

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"You've been out on the nets too long, Albie. Chispies can't think."

"I'm not saying they can think like you and me, but they're not just dumb hunks of filet traveling on blind instinct, either. Maybe it only happens when they're packed tight and running, maybe they form some sort of hive-mind then that they don't have when they're spread out. I don't know. I don't have the words or knowledge to get across what I mean. It's a gut feeling . . . I think they look on the net as a game, a challenge they'll accept only if we play by the rules and only if we give them a decent chance of winning."

He paused, waiting for another wisecrack from Vic, but none came. He continued. "They can gauge a net's strength. Don't know how, but they do it. Maybe it's those few fish always traveling in the lead . . . if they find the net too strong, if there's no chance of them breaking out, they must send out some kind of warning and the rest of the run avoids it. Sounds crazy, I know, but there's one inescapable fact I've learned to accept and apply, and it's made me the best: the weaker the net, the bigger the catch."

"So that's why you fired me when you found out I was repairing the nets with wire!"

"Exactly. You were hunting for a shortcut with the chispies and there aren't any. You made the net too strong, so they decided to play the game somewhere else. I wound up with the worst season I ever had."

"And I wound up in the water and out of a job!" Vic began to laugh, a humorless sound, unpleasant to hear. "But why didn't you explain this then?"

"Why didn't you come to me when you wanted to experiment with my nets? Why didn't you go buy your own tear-proof net and try it out on your own time? I may have overreacted, but you went behind my back and betrayed my trust. The entire crew went through pretty lean times until the next season because you broke the rules of the game!"

Vic laughed again. "A game! I must be drunker than I thought—it almost makes sense!"

"After forty years of hauling those winged devils out of the water, it's the only way I can make sense out of it."

"But they get caught and die, Albie! How can that be a game for them?"

"Only a tiny portion of the run challenges me at a time, and

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only a small percentage of those go into the freezer. The rest break free. What seems like a suicide risk to us may be only a diversion to them. Who knows what motivates them? This is their planet, their sea, and the rules of the game are entirely up to them. I'm just a player—one who figured out the game and became a winner."

"Then I'm a loser, I guess—the biggest damn loser ever to play." He rose to his feet and faced out toward the running lights of the *GelkCo I* as it lay at anchor a league off shore.

"That you are," Albie said, rising beside him and trying to keep his tone as light as possible. "You built the biggest, toughest damn net they've ever seen, one they'd never break out of . . . so they decided not to play."

Vic continued to stare out to sea, saying nothing.

"That's where you belong," Albie told him. "You were born for the sea, like me. You tried your hand with those stiff-legged land-roamers on the Council of Advisors and came up empty. But you and me, we're not equipped to deal with their kind, Vic. They change the rules as they go along, trying to get what they want by whatever means necessary. They sucked you in, used you up, and now they're gonna toss you out. So now's the time to get back on the water. Get out there and play the game with the chispies. They play hard and fast, but always by the same rules. You can die out there, but not because they cheated."

Vic made no move, no sound.

"Vic?"

No reply.

Albie turned and walked up the dune alone.

"Albieeeeee!"

One of the dock hands came running along the jetty. Albie had just pushed off and was following his crew into the early morning haze. He idled his scow and waited for the man to get closer.

"Guy back at the boathouse wants to know if you need an extra hand today."

Albie held his breath. "What's he look like?"

"I dunno," the dock hand said with a shrug. "Tall, dark hair, a piece missing from his right—"

Albie smiled through his beard as he reversed the scow. "Tell him to hurry . . . I haven't got all day!"

And out along the trench, the chispies moved in packs, running south and looking for sport along the way.

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CAPTAIN TITTLEBAUM'S TEST
by Martin Gardner

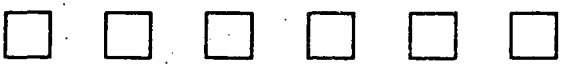
Captain Oscar Tittlebaum, in charge of the Earth's first space station—it was located midway between the Earth and the Moon—was constantly annoyed by how often his crew members failed to understand what he believed to be clear instructions on the orders and memos he issued from time to time. To test each man and woman's ability to follow simple directions, he prepared the following test. You are invited to take it to see how you would have scored had you been a member of the space station crew.

THE TEST

Before starting this test, read all the instructions carefully. Use a pencil or a pen to enter all required information in the spaces indicated. *No erasure of any answer is permitted.* However, the test has no time limit, so proceed slowly, and follow all instructions to the letter.

INSTRUCTIONS:

1. In the six squares below print the letters in the last name of the man who formulated the three laws of robotics.



2. In the nine squares below print the initial letters of the known planets of the solar system, starting with the initial of the outermost planet in the first square, then proceeding in sequence to the planet nearest the sun.

3. Cross out just seven letters in the statement below so that what remains will still express a sum of 18.

FIVE PLUS SIX PLUS SEVEN

4. Draw a circle around the verb that does not belong in the

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following set:

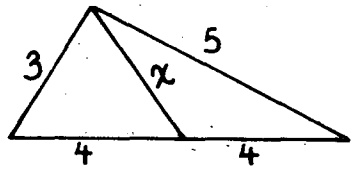
BRING BUY CATCH DRAW
FIGHT SEEK TEACH THINK

5. In the square below put the number of the century in which July 4, of the year 2000, will occur.

☐

6. Print in the space below the name of the only U.S. state that has a letter in common with each of the other 49 states.

7. What is the length of line x in the triangle drawn below? Print this length in the square on the right.



☐

8. In the six cells below print a three-letter abbreviation for one month, followed by a three-letter abbreviation for another month, to produce a six-letter English word.

☐ ☐ ☐ ☐ ☐ ☐

9. Place a prime digit in each of the three cells below. No two digits must be alike, and 0 and 1 are, of course, excluded. The three-digit number that results must be a multiple of each of the prime digits.

☐ ☐ ☐

10. At noon and at midnight the long and short hands of a clock are together. Between noon and midnight, how many times

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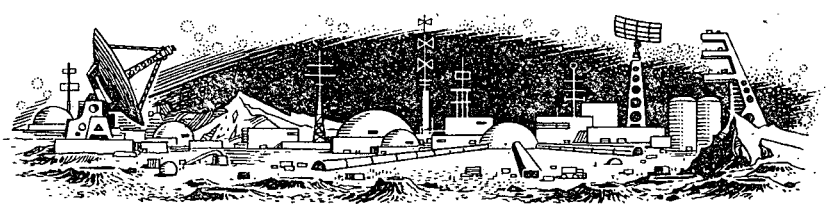
does the long hand pass the short hand? Print the answer in the square below.

11. Write on the line below: "I always follow instructions carefully."

---

12. Ignore all previous instructions with the exception of the test's first paragraph that begins with "Before" and ends with "letter." Sign your full name below and give your copy of the test to the Captain.

Now that you have (probably) flunked Captain Tittlebaum's test, turn to page 101 for the answers to the first ten question.



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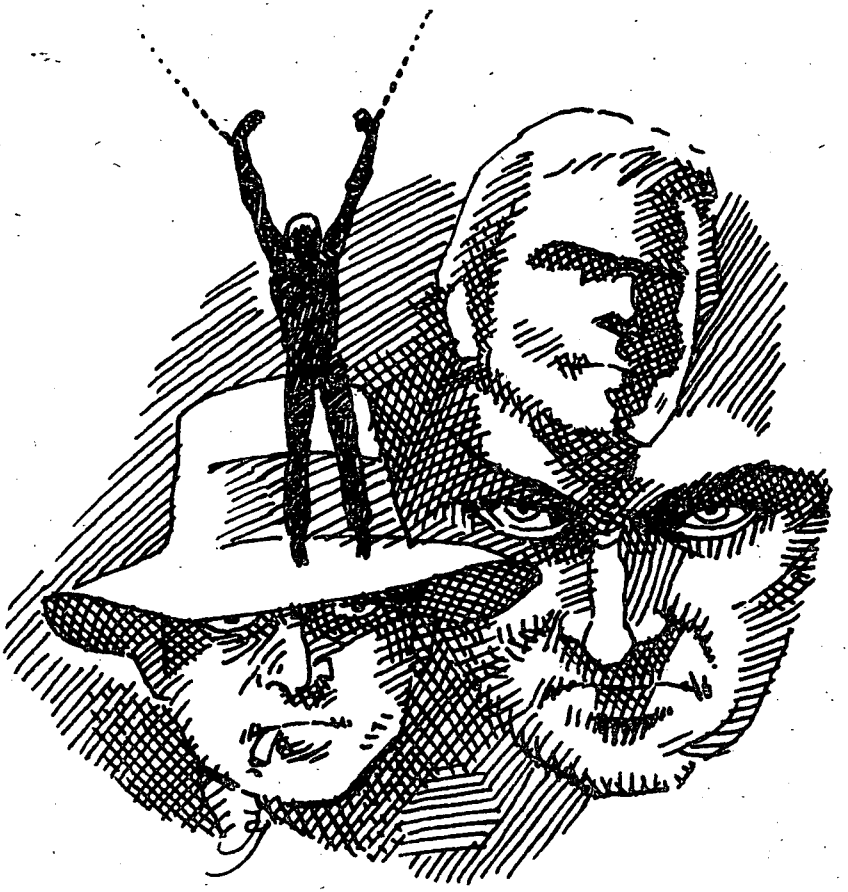
IN THE CELLAR

by Larry Niven

art: Jack Gaughan



Mr. Niven tells us that he never can predict when the urge will strike to turn out one of these little pieces. When it does, and he does, we're always happy to use them.

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The man in the folding chair was the only one in the room, as far as I could tell without moving my head. He had a round pink face and a pink scalp that showed through thin blond hair, and blue eyes. He wouldn't take his eyes off me. The .44 in his lap looked too big for him.

I couldn't move my head, or grimace with the pain in my arms, or open my eyes more than a slit. He thought I was still out cold. I wanted to keep it that way. I needed time to figure this out. The guard bothered me. He was too soft to be just muscle, and too patient. He didn't smoke, he didn't walk around, he didn't twitch. He just watched me.

My feet swung six inches above the dirt floor. I seemed to be hanging by my wrists. The walls were rough stone. Behind the seated man was a big wooden door with an iron bar across it. The air was cool and damp, with an underground feel. No windows.

I must have twitched. He smiled and spoke in a voice I knew. "Awake, Mr. Stone? Your skull must have incredible tensile strength. I suppose that's natural enough in your profession. You all seem to have that trait."

His voice was too big for him, like the gun. A resonant, commanding voice. I'd heard it once on the telephone. The Lynx: the faceless mastermind of an international criminal organization centered in Phoenix, Arizona. The Lynx had gotten me first.

I looked up. It wasn't good. There were manacles welded around my wrists. Steel chains linked them to bolt plates in the stone ceiling.

"Moose hit you with a a crowbar," the Lynx said. "I thought he'd crushed your skull. . . . Well, it won't help you. You've impinged on my activities once too often."

"Three times so far." Keep him talking, play for time. I wondered if he'd shoot. He didn't look like he'd ever fired a gun. Maybe he hadn't . . . himself.

He said, "Four times. In the Case of the Whistling Rapist. The girl was one of my most valuable people, until you altered her loyalty. She would have told you far too much."

"You killed Lila? You little snake!"

He frowned and raised the gun, two-handed.

"I didn't mean it, " I said quickly. "I lost my temper."

"It doesn't matter. You've seen my face."

"But—"

"They call you unkillable," said the Lynx. "Mike Hammer, Sam Spade, Mike Shane, Lew Archer, Shell Scott, you're all supposed

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to be unkillable." He considered me across the gunsight. "You, Stone. You've challenged the Mafia, the Syndicate, the Cosa Nostra, the Rosicrucians, even the Scientologists. Always you escape. I wonder . . ." The gun steadied.

"Now just a minute."

He smiled. "Pleading?"

"You don't know how much Lila told me. Or how much I wrote down." Question me, Lynx. Anything to buy time. Something would turn up. Something always did.

He thought it over. "No, " he said, and fired.

He knew guns. The slugs slammed into me in steady rhythm: heart, chest, chest, abdomen. I tried to scream with the flowering agony, and couldn't. The impacts swung me back against the stone wall.

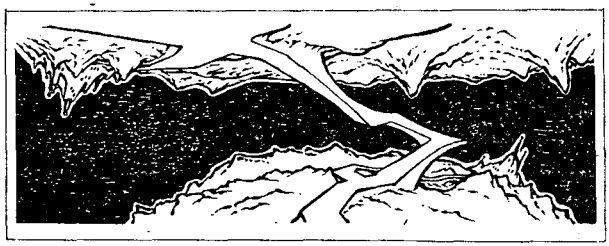
The agony faded. I said, "Damn! Now you've done it."

The pink man's eyes went wide and round. "Why, they're healing!" He paced a careful circle around me, watching the wounds pucker and fade. "You *are* unkillable!"

"Nah. It's just that some of us heal fast."

He walked backward until the wall stopped him. His voice came out shockingly normal, considering he was still trying to back through the wall. "Very interesting, Stone. But why were you afraid of being shot? If you can't be killed, or even hurt—"

"Because it's a secret." I broke the chains and came for him. He used his bullets, then tried to climb the stone wall. He didn't make it.



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THE SF CONVENTIONAL CALENDAR
by Erwin S. Strauss

A lot of gatherings of SF authors, artists and fans this time—get out to one near you soon. When writing, enclose a self-addressed, stamped envelope (SASE). When calling (10 AM to 10 PM only, and not collect), identify yourself and your reason for calling. For a later, longer list—and a sample of SF folksongs—send me an SASE at 10015 Greenbelt Road #101, Seabrook MD 20801. If you have trouble reaching cons, call me at (301) 794-7718 (same ground rules as above). If my machine answers, leave your number; I'll return your call. Look for me at cons as "Filthy Pierre." Special greetings to those of you I met at the Phoenix WorldCon.

ChattaCon, Jan. 5-7, 1979, Chattanooga TN. A. D. Foster, J. Chalker, Tucker. **(615) 892-5127**

HexaCon, Jan. 5-7, Lancaster PA. C. J. Cherryh and Stu Schiffman. **(717) 233-3943**

OtherCon, Jan. 14-16, College Sta. TX. M. Z. Bradley. Write: **208 Dellwood, Bryan TX 77801**

WisCon, Feb. 2-4, Madison WI. Suzy Charnas. **Box 1624, Madison WI 53701. (608) 256-2621**

Roc*Kon, Feb. 9-11, Little Rock AR. Kelly Freas, S. Bush. **Box 9911, Little Rock AR 72219**

FortCon, Feb. 9-11, Ft. Collins CO. **CSU Student Center Box 407, Ft. Collins CO 80523**

Boskone, Feb. 16-18, Boston MA. Herbert. **Box G, MIT PO, Cambridge MA 02139. (617) 244-2679**

QuakeCon, Feb. 16-18, San Fran. CA. **Box 9990 537 Jones, San Fran. CA 94102. (415) 863-1003**

CoastCon, Mar. 9-11, Biloxi MS. G. R. R. Martin. **Box D-182, Biloxi MS 39532. (601) 374-2933**

NorWesCon, Mar. 23-25, Seattle WA. Phil Farmer. **Box 24207, Seattle WA 98124 (206) 822-9129**

AggieCon, Mar. 29-Apr. 1, College Sta. TX. **MSC Box 5718, Col. Sta. TX 77844. (713) 845-1515**

OrangeCon, Mar. 30-Apr. 1, Orlando FL. **Box 15072B, Orlando FL 32858. (305) 275-5957**

LunaCon, Mar. 30-Apr. 1, New York NY. **Cole 1171 E. 8th, Brooklyn NY 11230. (212) 252-9759**

AmberCon, Apr. 6-8, Wichita KS. Zelazny. **505 N. Rock #909, Wichita KS 67206. (316) 685-9436**

BaltiCon, Apr. 13-15, Baltimore MD. **BSFS, Box 686, Baltimore MD 21203. (301) 467-0868**

Kubla Khan, Apr. 27-29, Nashville TN. **647 Devon Drive, Nashville TN 37220. (615) 832-8402**

Dubuquon, May 4-6, Dubuque IA. Grant, Martin. **2266 Jackson, Dubuque IA 52001. (319) 556-0906**

Just ImagiCon, May 25-27, Memphis TN. **4475 Martha Cole, Memphis TN 38118. (901) 365-2132**

V-Con, May 25-27, Vancouver, Can. **Box 48701 Bentall Sta., Vanc., BC V7X 1A6. (604) 263-9969**

PenultiCon, May 25-28, Denver CO. C. J. Cherryh. **Box 11545, Denver CO 80211. (303) 433-9774**

MidWestCon, June 24-26, Cincinnati OH. **Tabatow 3953 St. Johns Terr., Cinc'ti OH 45236.**

WesterCon 32, July 4th weekend, San Francisco CA. **195 Alhambra #9, San Francisco CA 94123**

Darkover Council, July 13-15, New York NY. Bradley. **Box 355, Bkln. NY 11219. (516) 781-6795**

DeepSouthCon, July 20-22, New Orleans LA. **1903 Dante, New Orleans LA 70118. (504) 861-2602**

SeaCon, Aug. 23-27, Brighton (near London), England. The World SF Convention for 1979. Join now, before the rates go up. **Finder Box 428, Latham NY 12110. (518) 783-7673**

NorthAmeriCon, Aug. 30-Sept. 3, Louisville KY. The continental con, while the WorldCon is abroad. Fred Phol, Lester Del Rey and our own George Scithers. Everything the WorldCon has but the Hugos—plus a river cruise. **Box 58009, Louisville KY 40258. (502) 636-5340**

NorEasCon II, Aug. 29-Sept. 1, 1980, Boston MA. The World SF Convention for 1980. Damon Knight, Kate Wilhelm, B. Pelz. Join in 1978 for $15. **Box 46, MIT PO, Cambridge MA 02139**

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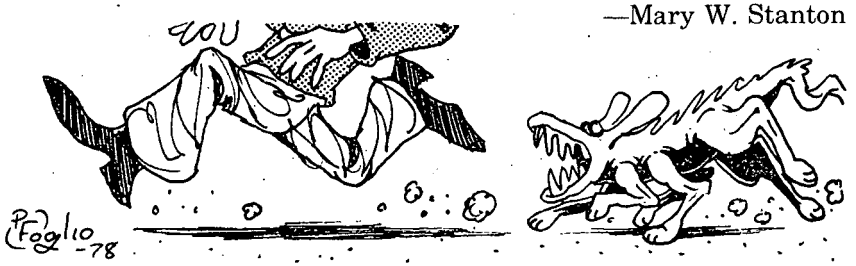
AD ASTRA, AL

Al left three kids and an ugly wife
To search the stars for a brand-new life
For a place where maidens with silver hair
And strange-colored eyes were unaware
Of in-laws that dropped in to eat,
And pets that bit with muddy feet,
Weedy lawns that turned to hay
If you didn't mow them every day
Of—well, the list itself was long;
Al craved unearthly wine and song.

He landed on a tiny planet:
Cold as ice cubes, hard as granite,
With a bright blue sun and crystal trees,
Golden rivers and ochre seas,
A race of aliens, tall and fair—
And a slender maiden with silver hair.

She had strange colored eyes, and a cosy haunt
That held three kids and a cranky aunt,
A pet that chewed on Al routinely
(With six legs and a smell unseemly—)
And, well—the list itself is long,
Which proves the adage isn't wrong:
"Home is where the crabgrass is, despite the crystal trees,
And even dogs with six legs scratch the same old fleas."

—Mary W. Stanton



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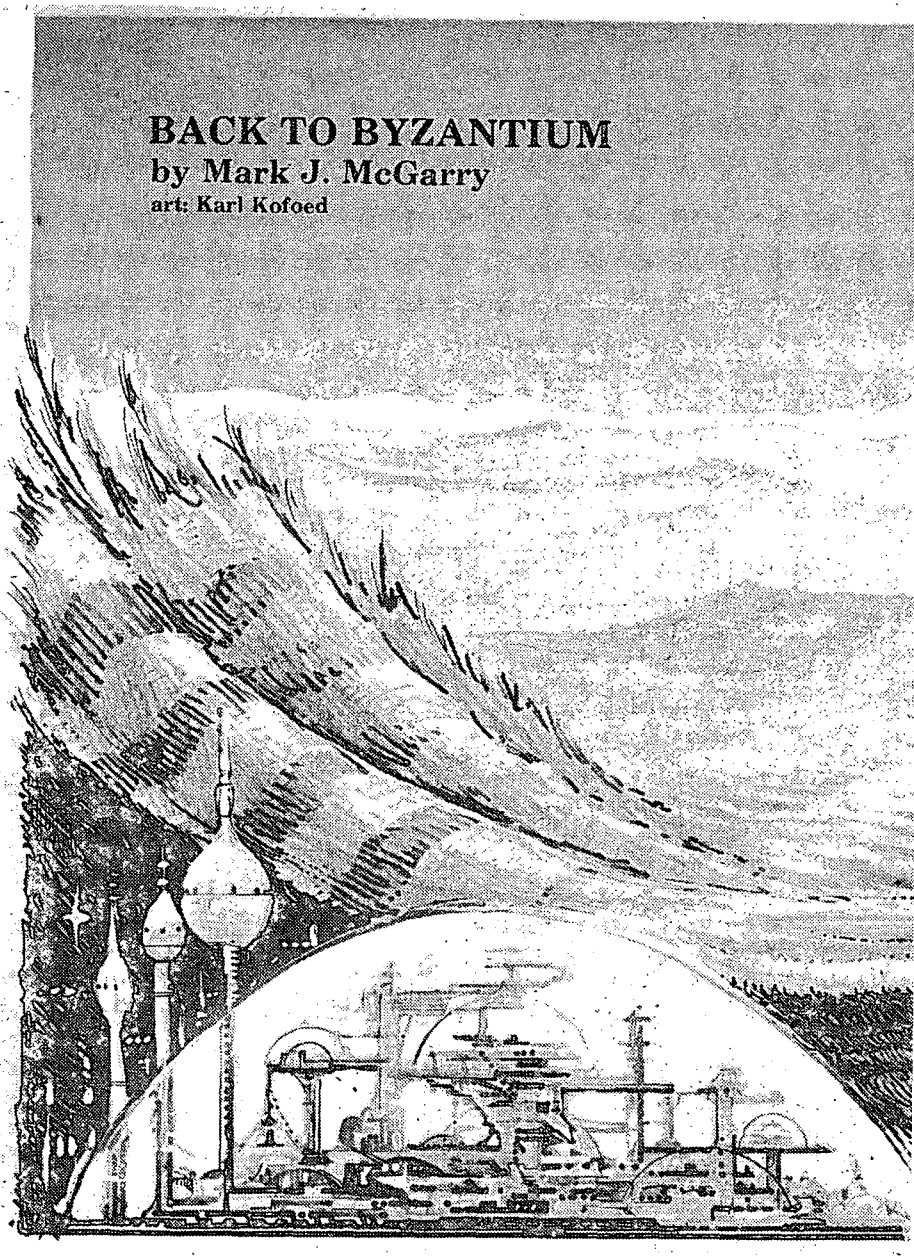
BACK TO BYZANTIUM

by Mark J. McGarry

art: Karl Kofoed



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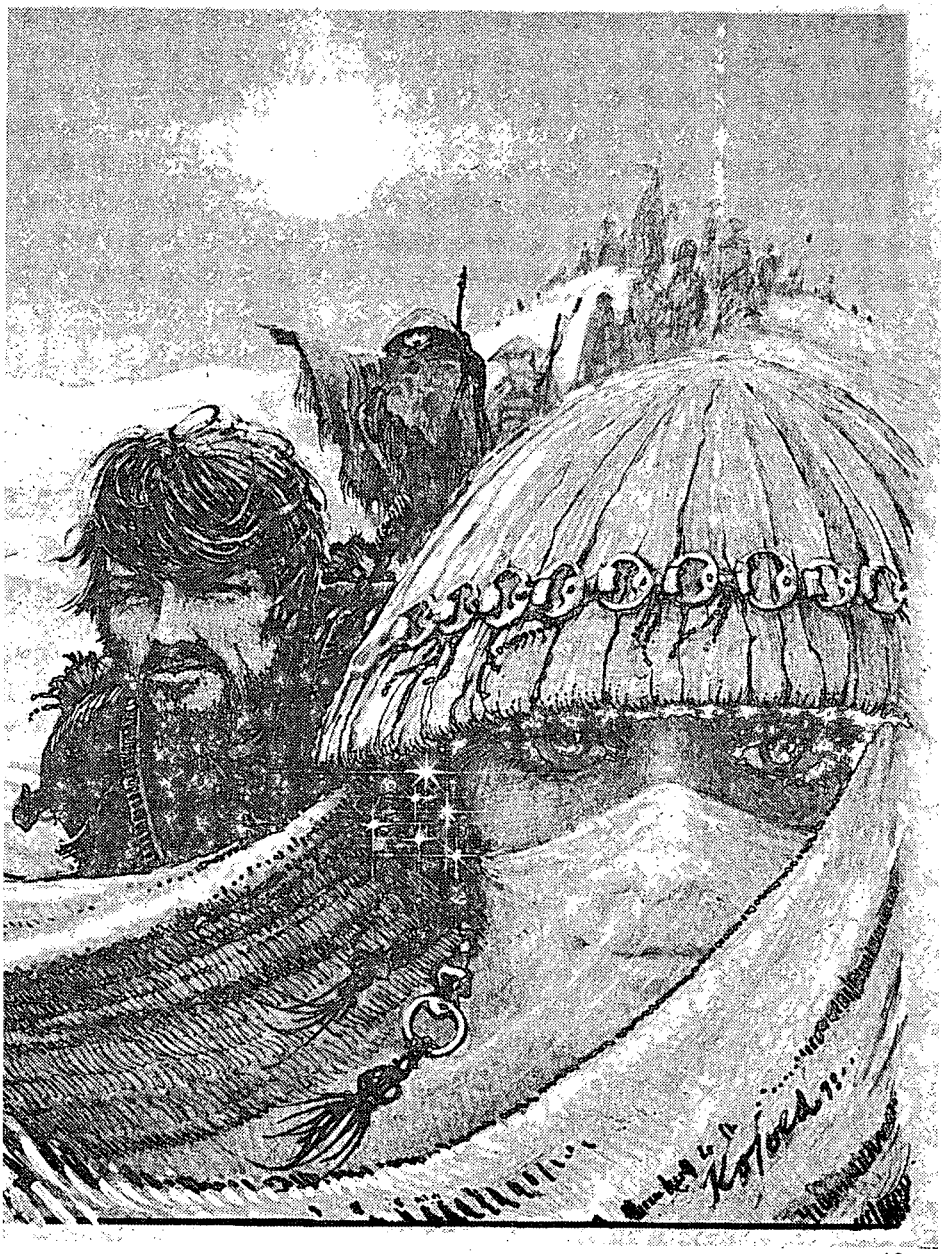

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The author was born on 6 February 1958. He is currently attending State University of New York at Albany (for English)—and writing the rest of the time. He reports that he is just reaching the point where he can support himself from this crazy business ("Back to Byzantium" is his fourth sale), and is hard at work on several other major projects.

"That is no country for old men."

—William Butler Yeats

His sandals found footing in the shifting slope of the dune. The weight of the sun on his back did not slow him. The stillness of the air did not affect him. He, who had been of and with the desert for all of his thirty years, was well-accustomed to it. And yet he remembered some other time, and he thought of cool metal corridors and domed gardens with regret at their loss.

He called himself Ken Irish, for reasons of his own. His sandals were of a vegetable material, and within them the soles of his feet were tough and hard. A pack was on his back; it was stitched and patched so thoroughly that hardly a trace of the original material remained. His clothes were rags. He had trimmed their frayed edges many times; he was nearly indecent.

Irish was fully as beaten and scarred as his trappings. His legs and hands were scarred, his eyes closed to slits by the sun. The skin of his face was seamed, his forehead furrowed; the lines of age had come to him too soon. But, unlike his clothes, he grew stronger with the passage of time, less vulnerable to the sun at its zenith or to the icy lashes of the wind at twilight. His breath was easy, his lungs full with each breath, and from his cracked and dry lips a song he had remembered fluttered like a banner in the dead air.

To arms, to arms, ye brave!
Th' avenging sword unsheath!
March on, march on, all hearts resolved
To victory or death.

The cadence of his stride did not quite match the rhythm of the tune.

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He was lost. He had had no destination in mind when he had fled the village uncounted miles to the east, many days ago, but he had thought he would reach some other, friendlier sanctuary long before this. He had not. Still, he survived, though each shifting dune was a bit higher than the one behind.

Abruptly, he stopped singing. He suddenly realized he had been hearing a sound—a trilling, some sort of melodic warbling—for several minutes now. It was a human voice, in song. He quickened his pace, the sand sliding, rasping from his feet as he climbed. Sensations he had felt but not recognized until now became apparent. A cacophony of human-sounds (an occasional clank, a shout, the cry of some domesticated animal) played out a background for the singer Irish saw as he crested the dune.

Her clothing was a variation of the robes most desert-dwellers wore. The robes flowed loose, except where belted tight at waist and under breasts. There was deviation from the usual pattern, based on the Bedouin *aba*, in the square-cut neckline. She wore a wide-brimmed hat of woven grain stalks rather than the standard *ighal* or head-piece. Her face was largely hidden from him by the knife-edged shadow of the hat, but from what he could see he judged her to be quite young, perhaps only fifteen or sixteen. She was squatting on the sand at the base of the dune.

Irish paused a dozen meters away (she had not yet noticed him) and said simply, "Hellay," in a voice just loud enough to carry to her ears. She looked up sharply, eyes wide, and gave a small cry of surprise. She stood, took a step backward, and then another—but more slowly. Irish could see she had been sorting small bits of metal that caught the sun and tossed it into his eyes. Slowly, so as not to alarm her, he started crabbing slowly down the side of the dune.

She backed up two more steps. "Stay away." Her voice quavered, and was a bit too loud.

He held up his hands, palms outward, and slowed his pace. "As you wish," he said agreeably, but not stopping. "I'm unarmed. I don't mean you any harm." She said nothing, but did not retreat farther as Irish reached level ground. Beyond her he could see a few square kilometers of flatland, a dried and crusty surface that might have been a lake a decade ago. An encampment (surely it was too crude to be a village, he thought) of compacted sand dwellings and a scattering of ragged, faded tents occupied a portion of the basin, perhaps three hundred meters distant. He saw few people, and suspected no one but the girl had seen him arrive.

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"Would it alarm you if I sat down?" he said. "I'm very tired." He could see she was pretty.

"I'm going to get my fathers and brothers."

"I'm sure I'd enjoy meeting them." He sat down.

She chewed her lip nervously, but now he thought he saw a flicker of interest in her eyes. "You came out of the desert, alone?"

"That I did, sweetheart."

She frowned briefly. "My name's Bethel." Irish nodded, smiling but saying nothing. He liked her breasts. Finally, she asked: "What's your name?"

"Ozymandias," he said, straight-faced.

"That's a strange name."

He spread his arms, and let sand fall from his outstretched fingers. "Look on my works, ye flighty, and despair." He paused. "Actually, I'm calling myself Ken Irish this time through."

"You can't have more than one name," she said.

He smiled.

"Ken Irish isn't your real name," she accused without hostility—or much conviction.

"Call me Ken."

"Where do you come from . . . Ken?"

"Turat," he said. "To the north. Can we continue this—?"

"But that's many days' journey! You must be tired, and hungry."

"Darlin', everything is 'many days' journey' from here," he said in a voice gone flat. His original animation had slipped from him. Now that he could allow himself the feeling, he realized that he was fatigued.

With rest and food a few hundred meters away, he was impatient for it.

"Maybe we can continue this show-and-tell later. Perhaps I'll even show you mine, if you show me yours. But right now I'd like to rest in the shade over there, and maybe take a little water. I have some paper; I can pay you." He glanced down at his feet. He reached between them and picked up a coin lying on the sand there. She started forward, then checked herself. There were at least two dozen coins; she had been playing with them. "I have a few coins for your collection," he added, "if you want them."

"We don't have many strangers here, but I guess you can come with me," she said. Then, remembering a lesson not well-learned, she added, "But don't follow too closely." Ken stood, slipped out of his pack and slung it over one shoulder.

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"Don't forget those," he said, nodding to the coins. He stepped back two paces to allow her to retrieve them. As she stooped, he saw the outline of her back and bottom more distinctly, and felt a mounting tension within him. He controlled it, not easily, but completely: that could quickly lead to a final and unpleasant destruction in these nomadic tribes, with their unsophisticated customs. He wiped the thought from his mind and followed Bethel at a discreet distance into the encampment.

Ian Ildrid scrutinized the stranger as a botanist might a new herb, and for the same purpose: to determine its use, and hazards. His gaze made Ken uncomfortable; he looked dangerous. Ildrid's hair was rough-cut short, his face was thick-boned and rugged. A sore on his lip and several on his neck indicated skin cancer, an affliction that killed many desert-folk before they were forty. Ildrid, Ken thought, might have been handsome, were it not for the lesions.

"Strangers seldom come across us, or we them," Ildrid said. "We like it better that way."

"You can always send me away," Ken said. "But—as you pointed out—it would probably prove fatal to me."

"We're a small band," continued Ildrid after a moment, as if he had not heard. "We pride ourselves on making our way honestly, without the thieving and trickery of most other bands. To do this, each of us must do his part. For your paper, I've given you food and water. If you've come from Turat, it's not likely you'll wish to return there, though it's the closest town. Masque is closest after that—eight days' journey—and it's there we're headed. You wouldn't make it by yourself. Cruel as it may seem to you, you'll get no help from us unless you have something of yourself to give." Bethel stood in the back of the dark, low-ceilinged tent, watching quietly. She accepted her father's will as natural law and without question, but as with many other things of nature, she felt this was unfair. Four other men stood in the tent: leaders of the separate families that made up Ildrid's band.

"I'm a student and an adventurer," said Ken. He paused. "I think I can say I have more knowledge than any of you in any discipline you'd care to name. Perhaps not direct experience, in all things, but I can do anything you'd have a need for with little or no instruction, and with no error. What have you got a need for?"

Ian frowned. The other men smiled at Ken's impertinence. "You've got self-confidence, that's for sure," said Ian. "Ziff, what've

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we a need for?"

The shortest man shrugged. "Horses. Some more goats. That's two things this fellow can't supply."

Ken made an impatient sound. "You can't be secure here," he said. "A scout, medicine man, herder, trader, priest?"

"No need for priests," said one of the men. "And unless you've brought your own herbs and potions, you'll find nothing to make your medicines with."

"In Masque I can get medicines—*we* can get medicines. Then I can help you."

Ian smiled. "But then you'd be in Masque and have no need of us. No one's sick anyway. We could take a herder or leave him—it's no difference to me—but since Bethel's the one that brought you in, we'll take you." Ian paused: no one disagreed with him. He nodded. "We'll need someone to show him around. Who volunteers?"

"Durk does; I'll go get him," said one of the men. Someone snickered, and they all smiled. Ziff left the tent, spilling light inside. Ken blinked.

"Who's Durk?" he asked.

"Our finder," said Ian.

Ken frowned.

"For one who claims to know so much," said Ian, "you don't know so much. A finder can lead us to the metal wells and the shattered cities. Once or twice, Durk has steered us around lakes and mountains we hadn't known would be there, and saved us time."

"And he can read maps," said a tall, balding man.

"Though that's not much of an asset, there being no maps of this land," said Ian. He gave Ken a hard look. "Are you really a medician?"

"With the proper tools—yes."

"Good. Until we get to Masque, don't be underfoot. If you're not as good a man as I think you are, you won't be staying with us, medician or not."

The tent flap closed again, and Ziff entered, followed by another man. He was surprisingly old for a nomad—forty-five at least, maybe even fifty years old. His skin was clear, though his face was wrinkled by age and exposure. His hair was long, light gray, pulled back and tied with a leather thong. He was Ken's height, but much broader. Durk probably outweighed him by fifteen or eighteen kilograms. Like the other men, he was dressed in a

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belted *aba* and sandals.

"Durk," Ian began, "this is a new man who'll be joining us, name of Ken Irish. I want you to show him around, make sure he doesn't do anything to anyone he's not supposed to do it to."

Durk suddenly looked angry, but Ken saw he was trying to control it. "I have to plot the route to Masque," said Durk. "There's a canyon . . ."

"You can do that, too," said Ian reasonably. "You'll be showing the new man around." Durk nodded curtly, turned, and left the tent. Ken followed, after thanking Ian with a small motion of his hand. As he had raised the tent flap to leave, he had smiled at Bethel, and her answering smile had warmed him.

Outside, he jogged to catch up with Durk. Ken matched the other's stride and they walked in silence for a few moments, until Ken said, "You don't seem very pleased with your assignment."

Durk said nothing. Ken shrugged. After a while, Durk said almost defiantly, "There's more important work for a finder to do."

"How did you get to be a finder?" asked Ken.

Durk made a rude sound in his nose. "You're born a finder. Don't you know what a finder is?"

Ken bristled at his tone of voice, but only shrugged again in reply.

"There's some I've met—and this includes me—who can remember places we've never been, remember other lives we've had. I can remember the lives of all my fathers back a few hundred years or so, before the big wars. I remember where the cities used to be, and the lay of the land. It's a useful talent. These people know they need me."

"Racial memory?" asked Ken.

Durk looked at him sharply (it was not a term the average nomad might use), but only nodded. To cover the awkward silence, Ken asked, "You said there were more of you?"

"I've met nearly a dozen, in my memory, but none in this generation."

Ken nodded, understanding.

"You accepted that pretty easily," said Durk. "Before I found these people, anyone I'd met was hostile to finders—if they believed they existed at all. Had you heard of them before?"

"Sure," said Ken. "Some."

"We're not very popular," said Durk.

"No," Ken said half to himself, remembering the scene in Masque—and others. "You're not very popular at all."

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There were less than a hundred people in the camp, and over half of them were men. There were few children. In the center of the camp was a tent larger and in better repair than any of the others. After Durk had shown him through the camp, he had left Ken at the entrance and gone about his other business. Ken went inside.

It was a dining hall. Ovens and small, sheltered fires were kept in the rear. Pallets and cushions provided seats. A center area three meters square had been left clear for entertainment, but there were no entertainers now. Preserving spices in the foods lent the air a tangy smell that was not unpleasant. The atmosphere was warm and slightly moist, a welcome contrast to the arid chill dusk had brought outside. Ken took a meal of stringy gray meat, some vegetables, and a cup of pale wine. He looked around for a place to sit.

"Hellay," said a voice from very close to him.

"Hellay, Bethel," he said, turning. The girl smiled up at him. She led him to a ring of cushions near the front of the tent. He set his tray on a thick pallet there, and sat down after Bethel.

"It's been a long time since I've stood in a cafeteria line," said Ken, around a mouthful of some stewed, doughy plant.

"All the other bands we've seen just crowd around until the food is gone," said Bethel. "Somebody thought of this way . . . Durk, I think. You've seen this done elsewhere?"

He nodded, keeping his eyes on his food. "Quite a long time ago."

"What did you call it?"

" 'Cafeteria.' "

She repeated the word slowly, and shrugged. "We don't call it anything." They ate in silence for a few minutes, then she put her plate aside and looked at him. "You talk funny."

"You talk—" he began sharply, then shook his head, and smiled in apology.

"Where do you come from?" she asked after a moment. "You really haven't told me."

He put his own plate aside. Though the portion had been too large for his shrunken stomach, he had finished it with difficulty. "It's very far away," he said.

"How far?"

"You could never get there. It's many years' journey."

"Nothing is that far away."

"This place is," said Ken. "It was called Byzantium."

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"I've never heard of it," she said, still disbelieving, but attentive now. "What is it like there?"

"It's not there anymore," he said flatly. "That's why I left. Byzantium was a land so vast, a man couldn't walk around its borders in a lifetime."

"Where is it now?"

"Gone . . . before either of us were born."

She pounced: "But you said you once lived there."

"She's caught you there," said Durk, sitting between them. "You tell fairy tales, Ken, but you should tell Bethel they're nothing more than that."

"Oh, I know," said Bethel. "They're nice to listen to, though. It's good to think that there are other places away from here." She reached past Durk and squeezed Ken's hand, a gesture that surprised him. "Will you tell me more stories, Ken?"

"Maybe later," he said. "I think I want to sleep now."

"I'll show you the way," said Bethel.

"No," said Durk. "I'm going now, too. I'll show him."

"All right. Good night, Ken."

"Good night."

The evening air slapped at him, making him shiver. Ken drew the cloak he had been given tighter around him.

"You should stop the stories," said Durk.

Ken looked at him. "What do you mean?"

"It's safe here, with these people. No one outside this camp knows I'm a finder. I'd been running a long time before I came here. For me, this is a place to rest. To hide, if you want to put it that way." From his tone of voice, Durk did not like putting it that way.

Ken looked at him steadily. "I don't know what you're talking about."

Durk shrugged. "It's on your own head, then. One finder can tell another, you know." He added coldly, "You're in that hut over there."

Ken was sharing quarters with a half-dozen other men. Without disturbing them, he flopped down on an empty pallet. Sleep was a long time in coming.

Ken was awakened the next morning by a hand on his shoulder. The camp was being broken down, and would he like to assist? He knuckled his eyes and went out into the pre-dawn air that was already losing the night's sharp coolness. In less than an

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hour, the tents had been levelled and packed away. Nothing remained but the sand huts, which would soon erode away completely.

Durk found him soon after they had finished packing. "Come with me. You're going to be working on the way to Masque." Ken followed the older man to what had been the edge of the camp, where a small herd of goats, horses, and a very few cows milled about. "Rytha!" Durk called. Most of the herders were small children; the only adult, a woman, waved to Durk and walked towards them, through the herd.

"She's married to Clark. You saw him back at Ian's tent," Durk said. Ken nodded. He didn't find Rytha attractive enough to warrant what Durk had obviously meant for a warning. Her face was pretty enough, but she was thin and tough-looking, as if the flesh had been pared from her bones. And Ken's solitary wanderings had taught him nothing if not self-control and abstention. Though Bethel . . .

"Hellay, Durk," said Rytha, as she reached them. "A new one?"

Durk said, "His name's Ken. Ian wants him to work with you for a while."

"Good enough." When she held out her hand, Ken shook it. Her palm was rough and dry. "Ever herded before?" she asked.

"I know how."

"Everyone knows how," said Rytha. "Have you ever herded before?"

"No."

"Then you've probably a lot to learn, whatever you say. Come." She turned on her heel. Ken followed stiffly, ignoring Durk's grin.

With no road to follow, Ian's band moved as a mob, spread out across a front many meters wide. The herd lagged behind. Before the last hours of daylight were gone, Rytha had asked Ken twice again if he had ever herded before—but each time, to Ken's satisfaction, a little more disbelieving of his negative answers. "I'm not sure I like you," she said to him at day's end, "but you're no idle braggart."

"Does the dog go after the sheep often?" asked Ken, to remind her of an incident earlier in the day.

"Often enough. She's wild. But Shar attacks bandits as well, and most think it's an even trade. You separated her and the lamb skillfully—as well as I could have done." She smiled at him quickly.

Three days later, in the late afternoon, they reached an oasis.

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In its center was an ancient pumping-station. Its concrete walls had weathered over the centuries. Any identifying marks or signs had long since been obliterated. The sands were dyed red where pipelines had once lain, and Ken saw a glint of metal at the base of a dune where some artifact had gone uncorroded. Cool green plants huddled around the pump-station as if for solace. From within still came the basso humming of pumps in working order.

Ian Ildrid waved and shouted orders. The movements of the individual members of the band seemed almost to have been choreographed as the animals were again herded into a manageable configuration, food was unpacked, and lines of children with skin bags formed before the rusted pump-house door.

Ziff, Rytha's husband Clark, and a third man shovelled at the sand that had blown against the doorway. As they were finishing the job, Durk joined them. He helped clear the last of the sand away, then did something to the metal plate set in the wall next to the door. The door shuddered and made a grinding noise. Ziff put his shoulder to it. Slowly, then more quickly, the door slid open. The children followed Durk inside, then began filing out a moment later, their skin bags filled almost to bursting.

Ken flexed his shoulders. The camp was a marvel of organization. Ian Ildrid had said they would reach Masque in five days. At first, Ken had doubted so large a group, with so many possessions, could make the journey so quickly. But burdens were intelligently distributed; the route they were taking had thus far provided no obstacles; most importantly, they had arrived at the station on schedule—just as the last of the water was gone. He saw Bethel coming across the sands to him, and smiled a greeting. They had not had much chance to speak during the march.

"How are you holding up?" she asked.

"I've got a heavier pack than I'm used to," said Ken, "but I won't have any problems. Is all this baggage—like the ovens—really necessary? That's what they've got me carrying." The three metal and ceramic fire-boxes were the heaviest single items the camp owned.

"Father says, 'the good will have good things.' "

" 'The upright shall have good things in possession,' " quoted Ken.

"Yes, that's how he put it."

"I've heard the phrase before," said Ken.

"And if we can ever find a place to settle, we'll want those things," Bethel said.

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"Do you think you ever will?" Ken asked.

"I think so. Maybe so." Her eyes were bright. Then she shook her head, and looked past Ken's shoulder. "I think my father wants you."

Ildrid walked quickly toward the pump-house, and gestured for Ken to follow him. Ken shrugged, nodded to Bethel, and ran to her father. "What's the problem?" asked Ken.

"I don't know," Ian said, Children scattered before him as he ducked inside the pump-house door. Ken waited outside until he and Durk emerged. Ian turned to the finder. "What's this I hear about wanting to go to Gisell instead of Masque?" demanded Ian.

Ken's eyes narrowed.

Durk, face impassive, answered smoothly, "I had wanted to discuss that with you, yes."

"Why?" asked Ian. "We've been planning to go to Masque for months. You suggested it yourself. We won't be able to find work in Gisell."

"I think we can," said Durk, "though perhaps not as much as in Masque; Gisell is smaller, of course."

"Then why?" repeated Ian.

"Because only two days beyond Gisell is the largest city of all—the biggest in the world. A shattered city ten times larger than any other. If we go there, we can stay. There will be food enough in the cellars to last us, and our children, a hundred times over. And more and better machines than you'll find rotting in any desert."

"What about the Giselle?"

"What about them?" asked Durk. "They don't care about the machines. They're like everyone else, afraid of the cities, afraid of any machines they cannot easily understand."

Ian nodded, half to himself, then asked, "Why didn't you tell anyone about this before?"

"I—" Durk began.

"Because he's lying," said Ken. "There's no city that close. Durk knows, and you should know, Ian, that most of the cities are so rotted they're nothing but husks. There is no old city closer than a month's march from here." Ken glared at Durk. The man knew, or suspected, that Ken was a finder; having decided there could not be two in the camp, he was trying to eliminate Ken's usefulness. There would be no medicines in Gisell. Ian might need a medician, but if Ken remained a herder he would be expendable.

"I'm the finder," Durk said to him. "I know, not you."

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"And I know you're lying," said Ken.

Durk got a dangerous look on his face. "Don't call me a liar."

"Both you be quiet," ordered Ian. He was silent for a moment. He looked skyward, eyes unfocussed, then looked at both men. "We will," he said, "go to Gisell."

It was harder to walk. His pack felt much heavier, and he cursed himself inwardly for having allowed himself to become dependent on Ildrid and his people. Durk had maneuvered Ildrid skillfully: when the band reached Gisell, and found no work, Ildrid would have to economize. Ken would be the first to go. What Durk intended to do once they left Gisell and found no city, Ken did not know. Perhaps Durk considered him such a danger to his unique status in the camp that he would be willing to confront Ildrid's anger with him, in exchange for having eliminated Ken as a threat.

Lifetimes of persecution and flight must have unhinged Durk, Ken thought. Surely the camp could use two finders, and there was no danger to either of them. But was that true? Ken could never bring himself to trust a . . . a *normal* human completely. They took drastic actions for little or no discernible reason. Logically, two finders, with their combined memories, would be an asset. But was there some law or taboo against having two finders in the camp? If so, Ken would be playing into Durk's hands by admitting he was a finder. No, he would bide his time, at least for a while, and see what developed.

But he felt trapped. He *was* trapped. He had no supplies of his own now, and even if he stole enough to get him to Masque—still the closest town—he knew Ian's men would not be far behind him. They would catch him, and even if they decided he was not worth the effort, Ken would have nothing to do when he reached Masque. In Turat he had been a prosperous merchant, but it had taken him ten years of dealings both legal and illicit to reach that position. In a small town such as Masque, there would be no such opportunity. He would not be able to stay there long—which meant he must stay here. Here (until Durk convinced Ian otherwise) he would be provided for.

Ken looked up, and Durk smiled at him.

The man was walking next to Ken, smiling at him. Ken called him a foul name. The smile vanished.

"I'm their finder," said Durk. "Not you."

"Go to hell."

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"I know you're a rememberer, too," said Durk.

"You're crazy."

"When Ian has time to think about it, he'll get rid of you. You won't be any use to the camp, now."

"Go to hell!" shouted Ken. And hit him.

Durk sat down hard on the sand, holding his mouth. As if they had been waiting for the moment, so quick were their reactions, three men grabbed Ken with rough hands. Ian Ildrid helped Durk to his feet, then laid a restraining hand on his shoulder as the finder started forward.

"He's trying to sabotage you," said Ken defensively. "He wants me out, and he'll mislead you to do it."

"He's our finder," said Ian quietly, looking at Ken.

"Dammit," Ken said.

"He is our finder," said Ian again, a bit louder, a good deal more emphatically.

Ken subsided. There was a taste of ashes in his mouth, and his knuckles hurt. He turned, suddenly, to the end of the column of people and livestock. "What was that?"

"It's a trick," said Durk immediately.

Someone screamed.

Ken saw nothing at first. With the others, he ran back along the line, pushing aside clumsy sheep and slow-moving humans. He could see someone flailing on the sand, surrounded and almost hidden by the herd. He pushed through, pushed through, and suddenly he could see Rytha twisting, agonized, under Shar, the dog. Tripping, half-falling, in his haste, Ken reached them and then, as if in a stop-action film, without continuity, he pulled the dog from the woman, kicked it (his leg went numb to the hip) and it dropped to the sands nearly two meters away, stilled. Later, he would not know what he had done.

Rytha was conscious; pain pulled at her features. She was whimpering, eyes half-closed. A calf muscle was torn in several places, and bone shone through the ragged, bloody tissue of her right leg.

"He surprised me," she gasped. "He never . . ."

"Be quiet," he said. "Lie still." Ken's hands hovered uncertainly over the wound. Suddenly someone pushed him from behind and he sprawled in the sand.

"Rytha! Rytha!" It was Clark, and Ken cursed.

"Keep him away!" ordered Ian, hauling the man away. "Ken, you said you were a medician."

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Ken nodded, brushing sand from his mouth.

"We have bandages, some herbs. You'll fix her up." It was a statement.

The bandages were clean, but the medicines were useless. There was a large amount of some kind of pain-killer (or so the hand-printed label read) but he was unfamiliar with both the formula and dosage. There were a few herbal concoctions that cured too many things too quickly to be genuine. Ken set these aside. He persuaded Ian to destroy a centuries-old medical kit that had been allowed to decay until its contents were worthless or dangerous. In the end, all Ken could do was wash the wounds with fresh water and wrap them. Ian supplied a litter and the procession continued.

It was just two days later that Rytha exhibited the first symptoms of ascending tetanus.

"She may die," Ken told Ian. He looked at Durk. "If Masque has the medicines we need, we should go there."

"She's hurt, yes," said Durk, "but she'll heal. You have your own reasons for going to Masque."

"And you have yours for preventing me from reaching it. Without medicines I'm a herder and excess baggage; with them, I can save Rytha." Ken turned to Ian Ildrid. "You know something about infections and sickliness. What Rytha has is very serious. You can see that her muscles are growing rigid. The disease will reach the muscle that make her breathe, and then she'll die. It may be too late. The disease is worse, the shorter the time between infection—when she was bitten—and when she exhibits the first signs of the disease. It happened very quickly to her, but I think perhaps she can still be saved."

" 'Perhaps'!" Durk forced a laugh. "You're a transparent liar, Ken Irish."

"Can you help her?" he demanded.

"*You* can't!" shouted Durk. "You're a liar!"

Ken hit him. Durk fell, as if it were a replay of their first fight, but this time when Durk stumbled to his feet he had a short-bladed knife in his hand—and there was no one to hold either of them back.

Durk was strong, and he had the weapon, but he was old, too. More importantly, Ken was fighting for his life. It made a difference.

Durk's first slash tested Ken. He sidestepped and evaded it eas-

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ily. The second time was closer, but the blade still did not touch him. The third: Durk feinted, preparatory to another cut and Ken (quickly, so quickly) lunged directly at the knife and groped past it. He locked hands of iron on Durk's wrist and elbow and put his weight on them. As Durk fell, the knife tore a thin red line across Ken's forearm. Ken let Durk go. The man fell on his blade.

Ian stepped forward then.

"You killed our finder," he said, not unreasonably, not at all dangerously.

Ken turned away as blood formed a spreading pool beneath Durk's body. The thirsty sand sucked his life down.

It had not gone as he had expected, none of it.

"You act like a finder," Ian said. Ken looked at him. "You speak like a finder."

"Does Bethel . . . ?"

"She does not know. It would not matter to her, if she did. She knows that memories are to be kept and preserved, whatever their form."

Ken looked down. "Like him?"

"No, not like him. He was no good to us, or anyone. He was our heritage, the embodiment of the past, but he didn't appreciate that."

"You *knew* there was no city beyond Gisell," said Ken. "You knew I'd have to fight him."

Ian shook his head. "That is exactly what I did not know. He may have joined with you, and then we would have had two finders. One or the other of you might have left. But whatever happened, it had to be resolved between the two of you alone, with no interference from me. If I had enforced some sort of agreement between you, when there could be none, the camp would have lost both of you. Now we can go to Masque and get the medicines for Rytha. I know they'll have them; I've been there before."

"Masque is built over an old medical complex," said Ken absently. "It's not totally in ruins."

Ian nodded. "We had better move, then. We'll have time . . . ?"

"If we're lucky, I think so. Some of us will have to go on ahead with Rytha."

There was a sound from behind them, a soft footfall. Bethel gasped, standing there, highlighted and so beautiful in the moon's light. Her features were frozen by shock.

"Bethel," Ken said, not knowing what would come after.

"You're hurt!" she cried, seeing the blood on his arm. She ran to

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him.

Ian Ildrid smiled.

Ken left the hut where Rytha lay, and Clark sat. He thought Clark needed more help than his wife now. Bethel and Ian met him at the entrance to the hut. "She'll be all right," said Ken, before they could ask. He was weary. Six of them had fast-marched ahead of the rest of Ildrid's band. Two days ago they had reached Masque, Ian had bartered for the medicines on his own good word, and Ken could not remember having slept since. He pressed a hand to his forehead. "You'll need a new finder," Ken said simply. He glanced at Bethel. He did not know if she, too, had deduced he was a rememberer, or if Ian had simply told her.

"We will be glad to have you," said Ian.

"I'd like to speak to you for a moment," Ken said to him.

Bethel nodded. "After that, get some sleep, and then look for me when you've rested." She left them.

"You know how I feel about her," Ken said.

"Yes."

"And you don't object?" said Ken. "Chances are that any male children we may have will be rememberers; that's how it's passed on."

"The finders are our link to the past," said Ian. "With them, we can rebuild the old times, relearn the old knowledge, and avoid the mistakes our ancestors made, that led to the great wars."

"Other people have thought that," said Ken.

Ian shrugged, and said, "The entire band feels this way. Those that cannot understand are made to feel unwelcome, and they leave. We must find more people who can understand—and more rememberers, as well."

"I've met a few," said Ken. "Three, over the last five lifetimes—and Durk. We don't usually stay together very long. It increases the chances of discovery."

"You don't have to worry about that here," said Ian.

Ken nodded. "I remember," he said, "when times were different."

Ian put a hand on his shoulder. "We can go back to those times. We can bring them here, to us. But first, go get some sleep."

Ken Irish dreamed of towers rising like a phoenix into the light of a new day.

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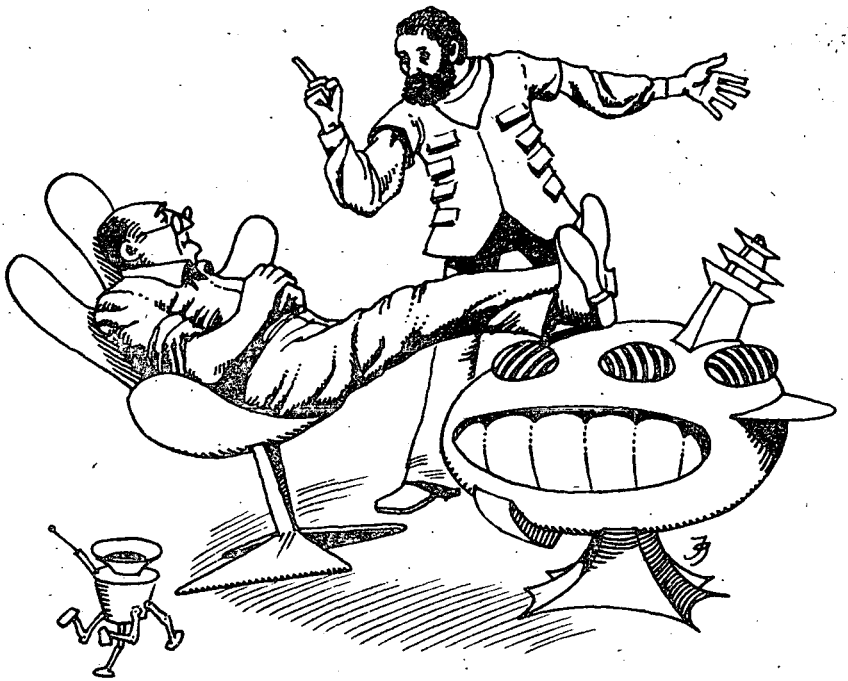
UP-TOP SUMMER

by Leah Palmer

art: Jack Gaughan



Leah Palmer reports being old enough to truly *appreciate Erma Bombeck and young enough–in appearance– to lie about her age. Among other jobs, she's been a business manager, professional dancer, waitress, parent, college teacher, and–currently– she works with migrant farmworkers whose objective is to enter post-secondary education. She is working on two books, one science fiction, the other a text. "Up-Top Summer" is her first fiction sale.*

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It all started when that therapist-counselor fella got next to the mayor and the city council. Till then, Up-Top was a nice little place where our politicos worked on the town business a couple-a mornings a week and spent the summer afternoons at the drugstore fountain. There's where the business really got done anyway. But I'm getting too far ahead of yesterday when it all got kinda complicated.

The day this guy first came into the drugstore, it was pretty hot, so the stools at the fountain were full. He leans on the end of the countertop and says, "Mornin', folks!" and smiles real nice. Jake Huebner, who sits on the middle stool, leans in and says, "Howareya?" Turns out this guy's name is Harrison—Rip Harrison. Don't know what "Rip" was short for—sumpin or other—he told us once but I forget. Anyhow, he said he'd been looking the town over and was thinking of moving in and staying. Some of the fellas at the fountain looked at him kinda sharp-like, but he was a friendly-lookin' sort—not at all like those bearded types that stop through now and then. So everybody settles back into their coffee and donuts (Margie makes real good coffee and homemade donuts) and let Harrison talk. That was the first mistake.

The upshot was that this Harrison guy moved into Larsen's old place. Mrs. Larsen even came in from the ranch and put up some new curtains she'd made special. Seemed to me the old ones looked okay, but like I said to Jake, this guy made people want to "do" for him. It was real strange how he had that effect on us.

The next time I saw Harrison was down at the park on Sunday. He was standing on the steps of the gazebo, conversing earnest-like with three or four of the couples from down by Chester Street. That's where most of the youngbecoupled with babies live. One or two had tots hangin' on their legs or slung onto a hip. Cute lil' tykes, and real well-behaved—all of our town kids are like that—not a sniveler or whiner in the lot. Anyways, he was talkin' to 'em and I could hear stuff like "authentic interaction" and "familial solidarity." At least, that's what it *sounded* like. The wife said she thought he was real handsome and that he'd talked real nice to her over the vegetables at the grocery store. Later on, I saw that he'd been asked in to Zeph Thomas's group for picnic supper. Zeph's our First Councilman. It looked to me like this Harrison ate a bushel of food and never stopped talkin' all the time he was a-wolfin' it down. It was an amazin' sight. I don't know why I kept watchin' him—I just did. And I sure don't re-

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member feeling suspicious or anything like that.

Looking back, hardly anyone remembers any worry-feelings connected with Harrison. Some of us wondered for awhile how a counselor-therapist could do any good for himself in a town like ours. Things don't move along fast or change much here. Oh, from time to time some of the young folks squabble. But it never gets too excitin'. We're quite a ways out and just *have* to get along.

A week or so later, I dropped by the Tuesday council meeting and there sits Harrison, watching the mayor and the council do the town business. There was nothing much that morning—a fence-section was down over by Olson's Creek. The water's kind of hot and dangerous there. It wouldn't do to have the cattle step in and burn their legs, so we keep the fence pretty stout. Also, seeing as how we get some stiff winds about once a month come summer, nobody is surprised to hear about a couple-a trees blocking the main cart-road. There was some reported but all that calls for is a committee to go move 'em, so that was nothing new. But this Harrison fella is leanin' forward in his chair like they was all decidin' the fate of the universe. And, by dang, that was the first time I'd seen him when he wasn't talkin'! So I volunteers for the tree committee, which kept me and the others busy for the rest of the week.

Saturday next, after I got my lawn cut, I wandered on downtown, said "Hello!" at the hardware store and the feed store and came into the drugstore about noon. Thought because the day was turnin' out to be a real scorcher, I'd get me a sandwich and some lemonade (Margie makes real good sandwiches and lemonade!). I sat myself on my regular stool. Musta been earlier than I reckoned 'cause nobody was there yet. Margie made me a real nice, thick meat sandwich with lots of salad. I was sucking up the last of my lemonade when Zeph and the mayor, Henry Swallow, came in. We talked about the tree-clearing and how it went, asked after one another's families, and then Jake came in. He punches me on the shoulder—not hard, just in the friendly way he has—and says, "What do ya think of Harrison's proposal, fella?"

"What proposal?" I says.

"Where *you* been?" he says.

"Out clearin' trees," I says.

Well, it seems that this Harrison had been talkin' (he was always talkin'!) to the mayor and Zeph and the rest of the council

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about improving their "communication skills." The idea was that the town business and the "citizen interaction" could be carried on so's nobody would waste any time because "time was money," accordin' to Harrison. He said that everything in town was too casual and slow and he could help us speed things up some by working on our way of thinkin' and behavin'. He'd offered to do a Seminar for all the folks to show how we could do it. Well, we *are* always lookin' to be better. Who isn't? So the council had said they'd entertain the idea and bring it up at the town meeting which was that night.

Town meetings are real nice. We get to see *everybody* 'cause even the Far-Away Outlanders come in for it. After the meeting, we have a big party with dancing and singing and lots of food. You know the kind I mean—real folksy. Like I said, we all know each other real well 'cause we're way out here by ourselves.

The town meeting got underway late, as usual, which was all right with us. Gives us a chance to visit and catch up on news from the Outland folks. I noticed that the Harrison fella was looking pretty tense. I figured he was thinkin' about his proposal. Later on, though, Jake told me it was because the meeting didn't start on time. That was kinda strange, especially since everyone was laughing and talking and having a good time. Well, we got the regular business done—announcements of new babies and becouplings, deaths from accidents (not too many since we got the uncertain kinds of dangers pegged quite awhile back), and production reports from all the Outlands. Things looked pretty good and everybody was rarin' to go to the party, but Henry said, "Just a dang minute!" so everybody quietened down while he introduced Rip Harrison. Henry told how the guy had been in town awhile and had his license as a counselor-therapist and how he had some ideas on how we could do things better if we had these-here "improved communication skills." Now, all the folks respect Henry, and if he says, "Listen," they'll listen. So we heard Harrison's proposal and figured it would be all right to spend a weekend on his Seminar. What the heck—it was free. And besides, I could cut my lawn Friday late. It sounded fine to me and to all the rest, too. That was our second mistake.

So we voted for it and broke off for the party. Harrison was everywhere at once, sweatin' and grinnin' and shakin' hands like he'd just been elected to be *king* or sumpin'. (By the way, it was a fine party. I danced with Margie and twirled her till she giggled

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and her boyfriend started to get jealous. She dances as good as she cooks!)

It was all arranged to have the Seminar the next weekend. The Outlanders would still be in town, stocking for the cold months. It took them about two weeks to load everything, so the timing couldn't have been better. The teenbetweens could get organized and take care of all the babies and youngbetweens for two days. It seemed kinda peculiar to hear that we couldn't go home at night, but I calculated that Harrison knew what he was doing since he had a license and all.

We decided that the best place to hold the Seminar was out of town in Youngman's Grove. We was all lookin' forward to it as sort of a weekend picnic. I recollect thinkin' it was a bit odd when Harrison said we didn't need to bring much food and only a pillow and blanket for bedding. But I figured he was making all the arrangements, so I didn't worry about it.

The next weekend came along soon enough. Saturday morning, we all arrived more or less on time and sat around in the amphitheater. Harrison had that tense look again and was rushin' around, fidgety-like, moving people so they were sitting real close and in rows as straight as he could get 'em. Some complained of being too close to breathe but he said, "No—sitting that way is part of the Seminar." So we went along with him. Finally, he got up on the platform and said we were going to start and he was going to give us the Rules of the Seminar. He said that *he* was the only one who had the right to talk unless he said somebody could (I told the wife that *that* sure figured!), that nobody could move their seats unless *he* gave them permission, and that they couldn't leave until *he* said the Seminar was over. He asked if everybody understood. We allowed as how we did, so he said in a real loud voice that the Rules were "now in force" and that *he* was the boss from then on.

Well, I swan!! The first thing to come out of his mouth was a mile-long string of cuss-words fit to kill a mule. They was so strong that the ladies was coverin' their ears and some of the men was turnin' red. The mayor raised his hand and said, "Hold on there, Harrison!" and Harrison told him to shut up 'cause he hadn't said he could talk and then went right back to cussin'. Boy-howdy! He must've cussed a lot in his time 'cause he went on for five more minutes without repeating a word. I had to kind of

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admire it, in a way. Though we've got to the point where about the most we say is "Gol-dang-it" or "I'll be switched," I'd have to admit if we *were* the cussin' kind, he'd be the champ of the whole planet.

When he stopped cussin', Harrison looked sort of flushed and winded and he just stood there staring at us, breathing sort of heavy-like. Well, none of the ladies had fainted or anything, but I could hear a few of the men grumbling and muttering some. Harrison told them to shut up and stood there with his arms folded till they all shut up. Then he started shoutin' about the Rules and went up and down the rows repeatin' the Rules and asking us to repeat them back till he was satisfied that probably everybody could say 'em. He said we'd better pay attention or we'd still be sitting there come *next* summer. After that, he started to tell us how worthless we all were and went around sticking his face right up into other folks faces, insulting them about the way they dressed and talked and acted. He told poor Mrs. Larsen that she probably did perverted sex-acts with the town youngbetweens. She passed out cold and he made everybody just leave her there on the ground. After awhile, she came around and got back up on her chair and sat there white as a sheet and a little glassy-eyed.

This kind of thing went on for about three hours. Actually, we was sort of gettin' *used* to it when one of the men stood up and headed for the restroom. It was Jake, and we all know his kidney's ain't too good anyway. I was surprised he could be polite for *that* long. Well, would you believe? Harrison told him to go back and sit down because he hadn't been told he could go anywhere and that he was just making it hard on the rest of us. Jake looked at him startled-like and went and sat down.

By then, it's starting to get hot out there. The sun was right overhead and the trees didn't hang over the middle of the amphitheater, just around the edges. Harrison wouldn't let anybody get a drink or even eat lunch after what Jake done. That's when a lot of the ladies and some of the men started to pass out. I was up by the edge and shaded some, and the missus was doing all right so far, but we were pretty hungry and thirsty and we sure did have to—well, *you* know. Speaking of that, there were a lot of people who couldn't wait, I guess, because in that blazin' sun there was a lot of odors driftin' around, if you know what I mean. Anyhow, he kept us there all day like that.

Sundown was some relief, excepting the fly situation had got to be pretty serious, and the gnats and biters came out. Harrison let

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some of us light the night-torches but it didn't help much. By now, we were all dog-tired and wondering what we had done to ourselves. After all, what kinds of fools would sit there all day with that guy spouting insults and cuss-words and upsetting everyone while they embarrassed themselves and fried in the sun?

Out of the corner of my eye, I seen Zeph slip into the shadows of the trees, slide around toward the cart-road, and hot-foot it for town. I had an idea what he was goin' after. I just hoped nobody had locked up the back door of the hardware store—the Under-Town Carrier-Portal is in there. No need to lock up. Nobody hereabouts steals. We've almost forgot why anybody would *want* to, anyways. And the only stranger in town was Harrison. Hardly seems likely anybody told *him*. We only get visitors in the summer when we're living in Up-Top and, winters, when we live in Under-Town, everything's too hard-froze for travelin'.

About an hour later, I was admirin' the fact that Harrison was still goin' strong when I seen Zeph coming up behind him, quiet-like, carrying one of the trank-guns from Under-Town. Guess everyone agreed with what he was up to because nobody moved or batted an eyelash or hollered "Look out, Harrison!" Even though it was a shame to have to dip into the technology in Summerseason, Deity knows, this was an emergency!

After Zeph dropped him, there was quite a rush for the dark parts of the grove and the drinking fountains. We all knew that Harrison would rest easy till we relieved ourselves, cleaned up, and had a drink and a snack. After that, some of the fellas bundled Harrison into a blanket and hauled him into town. They all rode the Carrier to Under-Town, stuck Harrison into a stasis-suit and a floater-box, addressed it, and sent him off with the Outlanders to the spaceport pickup. The spacers will grab him in a year or so, and when he wakes up maybe he can hold a Seminar for the three-legged aborigines on the Pleiades Frontier. Maybe he'll have better luck with *them*. (Margie says she hopes the food is good out there. Ain't that just like Margie?)

He was a nice young fella, that Harrison, and he meant well, I'm sure. But even if he *did* have a counselor-therapist license, he *talked* too gol-danged much!!

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ON KEPLER, NEWTON, & COMPANY
by George O. Smith

We've all heard of the Three Laws of Planetary Motion, developed by Johannes Kepler. They've been repeated so often that we recite them by rote, and seldom pause to consider how they were developed and what they really mean. This time we'll start, as usual, by rote, but then we'll take them one by one and examine them in detail. But before we begin, I want to straighten out a popular misconception of how Johannes Kepler got into astronomy.

In the popular reading, one can come to the notion that Johannes Kepler attended the school and observatory, Uraniborg, built on the Island of Hveen by Tycho Brahe, who had been granted that island "for life" with a generous pension by King Frederick of Denmark. And that Kepler's performance impressed the old master, who made him an assistant. AND that when Tycho Brahe died, the 21 years of carefully tabulated data of altitudes and azimuth of the celestial bodies came to Johannes Kepler by inheritance.

Part of the story is true; what is missing is the parts left out by writers covering this beginning of the scientific revolution who were anxious to get to the scientific parts and didn't go into some of the finer details.

Specifically, Tycho Brahe did spend 21 years at Uraniborg on the Island of Hveen, where he and his students used great quadrants to measure the positions of the visible bodies, and almost a thousand stars. But in 1588, King Frederick died, and the new king, Christian IV, didn't take to Tycho Brahe's high-handed attitudes, nor his rather short, sharp tongue when one of the dignitaries asked a question that wasn't quite brilliant. He revoked the "for life" grant of Hveen, and cut off Brahe's pension, and Brahe left Hveen without ever hearing of Johannes Kepler.

Kepler, on the other hand, and in the same year, 1588, won summary honors by a brilliant examination for his bachelor's degree—not in the sciences, my friends, but as a divinity student. Kepler was aiming to become a minister, and he didn't give a howling hoot about astronomy. His honors won him what we call a scholarship today, at the University of Tübingen, where he went to obtain his final degrees.

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Someone said that some men are born to greatness, some men acquire greatness by hard work, and others have greatness thrust upon them. Kepler is in the third batch. He entered astronomy by the back door.

At Tübingen, Kepler studied the works of Nicolas Copernicus, undoubtedly on the grounds that the ministry thought that if Copernicus was right, it would be wise for the ministry to be well informed about the heliocentric system, and if Copernicus was wrong, it would be wise to know the devil before taking up arms against him. We can also guess that Kepler gave study to astronomy, which was mostly astrology at the time because the learned men were, at least, half-believers. That is, while religion was against astrology on the ground that God rules the lives of men, not the planets, it was quite possible that God had put these things in the skies for some reason; so that possibly astrology might work if the input data were accurate.

So we know that Kepler studied the works of Copernicus, and that he probably studied astronomy-astrology, so he was not only of a brilliant mind, but well informed and inclined toward the mysterious. The result is that when the chair of astronomy opened at the University of Gretz, it was offered to him. Having come from a poor family, Kepler accepted the professorship, giving up (he hoped temporarily) his aspirations toward the ministry.

At Gretz, Kepler found himself up to here supervising students as he taught them how to cast horoscopes for the nobility who supported the universities, and for the wealthy who lived their lives by their horoscopes. So Kepler went at astrology the way he went at winning scholastic honors as a divinity student, because if the signs of the zodiac were clearly defined, modern information regarding the movement of the planets might well disclose a correspondence between the positions of the celestial objects and the events in the lives of men.

Meanwhile, Tycho Brahe, after spending a year in observation at the Castle Wandsbeck, near Hamburg, attracted the attention of Rudolph II, King of Hungary, Bohemia, and Germany, who in 1590 gave him residence at Castle Benatky, near Prague, where Tycho had his great quadrants sent from Hveen, along with the mass of recorded data, to continue his observations.

Kepler continued at Gretz. In 1595, he believed that he had discovered some relationship between the five regular geometric solids and the distances between the planets, and in 1596 this belief was published in a scientific magazine whose readers included

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Galileo Galilei and Tycho Brahe. This started a long and close correspondence among the three men. And it was the article about the five solids plus the correspondence that impressed Tycho Brahe with Johannes Kepler's brilliance.

Then in 1599 there came the usual flip-flap between religion and the sciences. That led to some royal decrees, one of which convinced Kepler that he had better vacate the premises. But the University of Tübingen wouldn't take Kepler back because he refused to comply, wholly and completely, with the religious insistence that one must take what the church said or else. And at the same time, Kepler received a letter from Tycho Brahe, offering him the position of assistant at Castle Benatky. So Kepler became Tycho Brahe's assistant, not his student, and with the mass of raw celestial data tried scientifically to see if there were some relationship between the stars and the men.

Then Tycho Brahe died after a short illness in 1601, and as Tycho's assistant, Kepler "inherited" the tabulations.

Well, then, we have Johannes Kepler using the massive data collected over 21 years of careful observing by Tycho Brahe. And here we must pause to examine how Kepler went at it.

In about 600 BC, Thales of Miletus demonstrated how the distance of a ship offshore could be measured by triangulation; that is, measuring the angles of the distant object as seen from the ends of a known baseline. The problem in space is to find the known baseline, especially when everything is in motion. For the angles were in the tabulations.

The second item is the fact that the lengths of the years of the visible planets had been known since antiquity.

The third is that Kepler picked Mars, which was hardly a "pick," for Mars is unquestionably the best object for the process. It has the highest eccentricity of the visible planets except Mercury, and Mercury is too close to the Sun to make continuous viewing possible. Second, Mars is "outside" of the Earth's orbit, so it is visible most of its own year. Had it been Venus, Kepler's First Law might not have been discovered for decades, since the orbit of Venus is almost a perfect circle.

The major item was to find a suitable baseline, and a bit of simple geometry added to known facts about the periods of the planets, Mars in this case, provide the information to obtain one. It starts like this: Picking a date, say 1 January, within the limits of visual observation, the Earth will return to that place in space

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every 1 January. But the year of Mars is 1.88 Terrestrial Years; the reciprocal of this is 0.532—that is, the Terrestrial Year is 0.532 Martian Years. So if we observe Mars every 1 January, we will be observing the planet along its orbit a little more than one-half way around from the last observation. Next, pick 2 January and plot the position of Mars along its orbit, and then 3 January, and on throughout the Terrestrial Year. One will find that it is hardly necessary to connect the points unless the drawing paper is somewhere between vast and tremendous. Normally in this kind of procedure, the plan comes first and then the data are collected according to plan, but in this case, Tycho Brahe collected the data first and it was Johannes Kepler who created the plan.

Now reverse the process. Mars hasn't a calendar, yet, but if we pick some celestial point, say the Vernal Equinox, and call it Mars 1 Day, then each Martian Year, 1.88 Terrestrial Years, Mars will be at the Vernal Equinox, while the Earth has moved around its orbit by 1.88 times 360 degrees. Next, plot Earth on Mars 2 Day, and on around. And one gets a fair plot of both orbits.

Here I must mention that the idea of triangulating Mars using the diameter of the Earth does not work because the distance is too great to use the diameter of the Earth as a baseline. One could probably do it with modern instruments, using not the angle measured on Earth, but using the parallax method against the so-called fixed star field. One can triangulate the Moon, but Mars? Sorry.

Now the concept of planetary orbits being composed of perfect circles with constant, uniform motion, with the resulting need for fudge factors, such as epicycles, came from superstition and religion. Kepler, who had studied astrology and half-believed it, and studied Copernicus at the highly theological University of Tübingen as an advanced scholar in divinity, had both superstition and religion to aim his astronomical work into the epicycle business.

But the epicycle did not work, no matter how hard he tried. It made a very crude approximation, quite far from the data accumulated by Tycho Brahe. Everything that Kepler did made the orbit come out an ellipse. In his correspondence about this, Kepler used some language hardly becoming a divinity student, but added that what he thought about elliptical orbits had nothing to

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do with their existence, nor would his opinion change the facts. So he put down:

ONE: The orbit of a planet is an ellipse, with the Sun at one of the focal points.

Now, the epicycle process entered astronomy in ancient times, to explain retrograde motion; it had nothing to do with the operation of a planet along an ellipse, since the ellipticity of the orbit is so close to a circle that it took the highly sophisticated measuring quadrants of Tycho Brahe to accumulate enough precision data to make the ellipticity evident. The epicycle remained after Copernicus, no longer to explain retrograde movement, but to account for the fact that the movement of the planet is not at a constant velocity. About all this did was to swap the Earth as center and the Sun in revolution, and continue using the epicycles.

But Kepler, in his analysis, found that despite religion and superstition, Mars not only moved in an ellipse rather than a circle or combination of circles, but it also moved along the ellipse at a far from constant rate.

This may or may not have disturbed Kepler as the elliptical orbit did. He did spend some time trying to figure out just why this took place, and to find some sort of mathematical relation to explain it. And in trying everything he could think of, for Kepler believed that there was something importantly methodical about the Solar System and celestial events, he came up with:

TWO: The radius vector sweeps over equal areas in equal times.

The "radius vector," for the four or five of you who have never met the term before, is a line from the Sun to the planet. And for those a bit weak in geometry, the "major axis" of the ellipse is the dimension of the length of the football; the "minor axis" is the width. They lie at right angles and where they cross is the center, or "centroid" since the affix "—oid" means "something like a —." Now, if one takes a compass or dividers set to the dimension from the centroid to either end of the major axis, then transfers the needle to the point where the ellipse crosses the minor axis, the points where the marker crosses the major axis are the focal points.

So Kepler discovered that for a given time, the radius vector

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will sweep over an area enclosed by the Sun, the ellipse, and the positions of the radius vector at the start and finish of the given time—and at any other place along the orbit, for the same given time, the area swept over will be equal to any other.

At this moment we'll not try to explain how and why, because the bright fellow who explained it wasn't born until 12 years after Kepler's death; we'll meet this fellow in the next generation.

After Law Two was announced, Kepler spent some years with his charts and his figures, seeking some correlation between the distance of the planet from the Sun, and the length of the planet's year. When he found the relationship, it made less sense than Law Two:

THREE: The cube of the mean distance from the Sun is proportional to the square of the planet's year.

It works very nicely, and a bit of button-pushing will show how nicely. Dropping the endless numbers that are necessary for fine precision, and, since this is really a relation between one planet and the other, we can save time by using the Astronomical Unit (the distance between the Earth and the Sun) as the unit of distance, and the Terrestrial Year as the unit of time.

Using D for distance, Y for year, and the small subscript $_e$ to denote Earth, the cube of the distance, D_e^3, comes out $1 \times 1 \times 1 = 1$, and the square of the year, Y_e^2, comes out $1 \times 1 = 1$; so the relationship is $D_e^3/Y_e^2 = 1$.

Using the same units for Mars, and the small subscript $_m$ to denote the planet, the same ratio should exist; that is, $D_m^3/Y_m^2 = 1$. But here we must use some long figures because things do not come out in nice, even strings of zeroes. In the book, the distance of Mars in Astronomical Units is 1.523, which cubed gives 3.537. The Martian Year, in Terrestrial terms, is 1.880, which squared gives 3.537. And 3.537/3.537 = 1.

All right, so I cheated, or had to. The figures for planetary distances tabulated in the books were calculated *using* Kepler's Third, from the planetary years which have been known since man learned to count. But the figures in the book run into significant figures so long that they come down to a precision that we couldn't possibly have measured until radar bouncing came along.

But as stated, Kepler's Third is incomplete. We hereby forgive him since he was only working on the Solar System. One can not use the Terrestrial terms for distance and time to apply to the

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satellites of Jupiter, for example, unless one is going to compare Callisto with Ganymede—until a parameter is added that includes the mass of the *system*. When this is complete, the astrophysicists can determine the total mass of a binary star compared to the Solar Mass from the binary's period and orbital size.

Johannes Kepler died in 1630, his work well done.
Isaac Newton was born in 1642, his work yet to start.

Aristotle had it figured out nicely. All material matter in Aristotle's Universe was here at the Earth, in the center, and those things in the sky were not matter or they'd have fallen along with everything else at the time of Creation.

But now it turned out that Them Things Up There are massive planets moving nearly in circles, producing angular momentum, which produces centrifugal force. Kepler had the works oiled out and the system running sensibly, but who winds the spring?

A book I've received recently said that Sir Isaac Newton discovered centrifugal force. Methinks the writer was hurrying. Newton didn't "discover" centrifugal force any more than Gutenberg wrote the Bible. Centrifugal force was known in Biblical times; it had been crudely analyzed by Goliath when David belted him in the skull with a stone launched from a sling. Newton may well have put centrifugal force down to cold mathematics that Goliath couldn't take in concrete form, but he didn't "discover" it.

Newton was born the same year Galileo died. So in his youth, Newton had the works of both Galileo and Kepler to study.

Now, Galileo is given much publicity over two events in his life. He is supposed to have tossed cannon balls from the Leaning Tower of Pisa to prove his point about falling bodies; and he is credited with un-recanting his recantation by muttering, ". . . nevertheless, it moves!"

The second is shrouded. Some claim that he did mutter the words after he recanted; The Church, highly powerful in Italy, which kept all the historical records, says he did not.

The first is questionable. Whether he or his assistants dropped weights or cannon balls from the Leaning Tower may have been done as proof to the objectors who believed in Aristotle, but only after Galileo knew that he was right. One thing we know; he used a "thought experiment" in his lectures; the process of describing an experiment that can't be done physically but can be figured out by logic.

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In this case, Galileo led his listeners up Aristotle's garden path to the point where they were in whole agreement that a twenty-pound cannon ball would fall twice as fast as a ten-pound ball. Then Galileo asked what would happen if the two balls were dropped while tethered together with a length of chain. First, the twenty-pound ball would drop twice as fast the the ten-pound ball until the length of chain was taut. Then, what would happen? Would the ten-pound ball slow the fall of the twenty, or would the twenty-pound ball speed up the ten? Or would they fall as a thirty-pound mass? And how would the balls know they were tied together so they'd know how to fall?

The main problem in this avenue is facing the two-horned problem of 1) finding a place high enough with a full dead drop so that several seconds of free fall could be observed, and 2) how to mark and time the positions of the mass as it fell.

Galileo solved the first problem by using an inclined plane. The inclined plane is one of the six simple machines of the Ancient Greeks; given a plane with the rise of 1 foot over a 10 foot length, the mechanical advantage is 10:1, meaning that a 10 pound weight would, ignoring friction, require only a 1 pound pull to bring it up the plane to the 1 foot rise. Since the simple machines are reciprocal, the pull of gravity down the plane is cut 10:1. Put in proper terms, a free fall drop of 2 seconds is 64 feet; put on the inclined plane, the 2 second "drop" is 6.4 feet.

The timing and marking problem is not spelled out in history. We've been told that Galileo and his helpers may have timed the fall using their pulses, and I must also point out that this took place at the University of Pisa, where Galileo discovered the principle of the pendulum. We've been told that he and his helpers put marks on the plane at the time signal, although it would have been better and more precise to have coated the rolling balls with soot or chalk, to make a permanent mark on the plane.

Just how it was done isn't that important; what is important is that if the ball is given a sidewise roll horizontal to the incline, horizontal motion and falling motion are independent of one another. Changing the incline did not affect the horizontal motion, although it did indeed affect the velocity of the fall. And given the two motions, the ball rolled down the plane in a parabola.

So from these experiments there came the equations for freely falling bodies:

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1) $V = AT$

2) $D = \frac{1}{2}AT^2$ (Or $\frac{A}{2}T^2$)

which give velocity, V, and distance, D, of a body under the influence of an acceleration, A, during the time, T. The two equations are related; the second is derived from the first, although the reader who has never been through the relationship may not understand how come. Mostly the reason is that our experience in acceleration occurs in the family car, in which the acceleration time is short whereas the running time at constant speed is fairly long.

The acceleration, A, of the falling body is 32 feet per second per second, or 980 centimeters per second per second, and this continues so long as the body is in fall. In the automobile, at cruising speed and with a driver that doesn't slam on the brakes eight feet before the red light, or leave rubber behind at the first flash of the green, we're used to thinking that at 35 miles per hour, it will take 1 hour to travel 35 miles, et cetera. But in free fall, the body is increasing its speed because of the continuous acceleration of gravity, thus:

1) $V = AT$.

And this is what the mathematician calls a "linear" equation; meaning that the velocity always increases with time. So we cannot simply multiply velocity by time to get distance, since the velocity increases as time goes by. So—at 32 feet per second per second, the body will be falling at 32 feet per second at the end of the first second, having started at zero velocity when let go. And at the end of the next second, the velocity will have increased by another 32 feet per second, and so on. The equation is linear, so the velocity to be used to calculate distance is the average of the velocity at the start ($V = 0.0$) and the velocity at the end of the drop or time limit. This equals one-half the ending velocity.

If we put the idea of travelling by automobile into a simple equation, at a constant speed, it comes out $D = VT$. But V itself is equal to AT for the end of the fall, and the average must be used, so combining them, it comes out $D = (AT/2)T$ which simplifies into:

2) $D = \frac{A}{2}T^2$.

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This, by the way, is a form of very simple-minded calculus. We can say that acceleration is the derivative of velocity, which is the derivative of distance; conversely, distance is the integral of velocity, which is the integral of acceleration, and since acceleration is a constant, it would drop out on the next step down since acceleration isn't the integral of anything. This leaves zero, which is quite fine since if nothing is moving, very little is about to take place.

So by Newton's time, the thing that stood out like a signboard was the ugly fact that there were solid planets with mass and momentum moving like the missile in David's sling, but without any sign of the strap that kept them from flying off into the great void yonder. So Isaac Newton put Kepler and Galileo together and put into words what everybody knew but had always managed not to say.

That is, the ancients believed that a moving body could come to rest—and then they went out and invented the wheel to put on their carts so the cart wouldn't come to rest too soon. Second, they used more than one horse to move a load because two horses or more can move a heavier load. And third, every swimmer knows that if he dives from a small boat, he will go forward while the boat will go backward. Newton put these three concepts into the Laws of Force and Motion:

ONE: A body at rest will remain at rest, and a body in motion will continue in motion in the same direction, at the same velocity, unless it is influenced by some force.

TWO: A body under the influence of some force will respond in the direction of the force, and proportionally to the magnitude of the force.

THREE: For every action, there will be an equal and opposite reaction.

Here we meet another contributing character, a Professor Robert Hooke, who was born a little before Newton and had his work well under way when Newton began to think about motion. Robert Hooke's main interest was in the elasticity of materials, and discovered the rule that is known as "Hooke's Law" which says that "The stress is equal to the strain." This is a complicated way of saying that a ten-pound weight will stretch a coiled spring twice as far as a five-pound weight, which he proved by demonstrations.

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And we can promptly wonder whether the story about Newton and the Apple hadn't been derived in Robert Hooke's laboratory. In a vague sort of way, Hooke suggested that there was some force that pulled the weights down to stretch the spring. And Newton gave Hooke credit for suggesting the foundation for the Theory of Gravitation.

The story about Newton getting hit on the head by a falling apple is about as true as George Washington and the cherry tree. What did go on is that Newton used the idea in a thought experiment. He said that the apple wanted to fall, but was held aloft by the stem and the branch. The apple was at rest and would stay at rest until it was ripe. The apple was under the influence of some force, but was restrained from responding to it because of the springiness of the branch, like Robert Hooke's experiments in elasticity. When the apple ripened, it fell, and the branch recoiled upward when relieved of the weight.

And Newton went on to say that it was the mass of the apple that made it fall, and if the apple were cut in half, each half of the apple would receive one-half of the whole force; thus it would fall at the same speed, because one-half of the force acting on one-half of the apple comes out 1 to 1. Then he took his apples into outer space and pointed out that the force that keeps the planets in their orbits must be the same force that makes the apple fall. So he started off with:

Every particle in the Universe attracts every other particle with a force directly proportional to the product of their masses, and — ?

Here we pause for meditation. The big question: Does this force diminish with distance? And if so, *how*?

It would be a long time before Einstein suggested that gravity was a form of radiation. But it *had* been a long time since mathematics had been put down proving that both light and sound diminish in intensity according to the old inverse square law—and light and sound are forms of radiation. It looked like a fine place to start.

Here we have another hiatus in scientific history. We don't know whether Newton used the following thought experiment to polish off the second part of the Theory of Gravitation, or whether he used it as a lecture explanation to illustrate his point. It goes like this, no matter which:

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See Figure 1, showing the Moon in its orbit. At Point P along the orbit, the force of attraction between Earth and Moon is cancelled. The Moon, obeying Newton's First Law, goes on a straight line tangent to the orbit at the same velocity as the orbital velocity at Point P. At some determined time later, the Moon will have moved to Point X. Then at Point X, two things take place at once. The Moon is stopped in its tracks, velocity becomes zero; and the force of attraction is restored. The Moon now falls toward the Earth toward Point Y. The time it takes to fall from Point X to Point Y will be the same time spent as the Moon went from Point P to Point X.

At this point, one can use Galileo's formulas for falling bodies to determine the acceleration at the Moon's orbit. That old inverse square law comes out nicely, it does. And with planetary distances given by Kepler's Laws, one could easily play the thought experiment using the Sun's attraction upon planets that go deeper and deeper into space, and show that the inverse square law works as far as the eye can see, at least. So Newton polished off his Theory of Gravitation:

— and inversely proportional to the square of the distance between them.

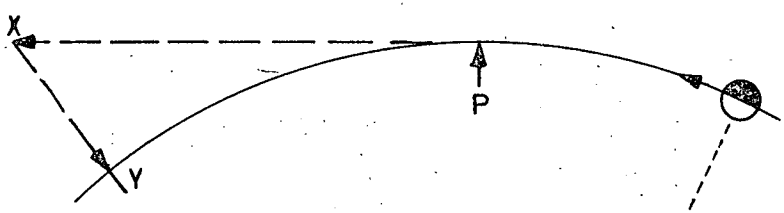

Figure 1: The Moon in its orbit. At Point P, the attraction between the bodies is cancelled, whereupon the Moon continues along a straight line, tangent to its orbit. Then at Point X, the attraction is restored, and the Moon is stopped in its tracks. The Moon will then drop toward the Earth along the line X to Y. At Point Y, where the falling Moon crosses the orbit, the time it would take to fall from Point X to Point Y will be the same as the time it took to pass from Point P to Point X. This can be used to determine the attraction, by calculating the acceleration, of the two masses at the distance of the Lunar Orbit.

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In a book I received recently, it said that Newton had "discovered" centrifugal force, and I commented that he may have put mathematics to it, but he hadn't discovered it. But let's do some highly-educated guesswork on the problem. Obviously, one can argue quite logically that centrifugal force must be the result of the mass being whirled, the radius of the whirl, and the speed at which the mass is whirled. But the finest theories must be proved by examination of physical evidence or they remain a theory. So the only way to measure centrifugal force is to whirl some mass on a line of known length, tied to some measuring device, say most likely, a scale. But at the time, the only scales in evidence were balances, somewhat highly improved over the one that Justice holds aloft, but a balance nonetheless. Now, can you think of a wilder idea than putting a balance somewhere on a string and whirling the whole shebang around while putting weights on one of the pans?

Robert Hooke's investigations that led to Hooke's Law did not make the spring scale popular. But it is quite likely that some form of spring balance came into use in physical laboratories where the scale could be calibrated before and re-checked after some experiment in which the standard balance would have been worthless.

It is also quite likely that Isaac Newton put mathematics into both attraction and centrifugal force at the same time since the two must be equal and opposite if the planets are to stay in orbit.

Now, centrifugal force is no more than momentum in a spin. Momentum is mass in motion; it takes energy to get the mass in motion, and it requires the same amount of energy to bring it to rest. Put the mass into a flywheel and it takes energy to make it spin, and energy to make it stop, and if it spins too fast, it will fly apart because the centrifugal force has exceeded the strength of the material of which the flywheel is made. And momentum in a spin is called "angular momentum," which consists of mass, the radius from center to the mass, and the velocity which can be stated in either of two terms: "linear velocity," which is the speed measured over a very short arc and for which we can really read "orbital velocity"; or "angular velocity", which is the number of revolutions per period of time, usually expressed in radians.

So the spinning ice skater builds up his angular velocity and the resulting angular momentum until his spin pleases him—then he brings his arms in close and the angular velocity increases. Because, you see, angular momentum is the result of mass,

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radius, and angular velocity. And in an "independent system" *angular momentum must be conserved!* So the mass does not change, but the radius has diminished, and to make up this change, angular velocity must increase.

To explain that "Areas swept by the radius vector . . ." requires that two apparently unrelated concepts be translated by the same interpreter into the same language.

Figure 2-A is the rectangular coordinate graph of the V = AT equation; velocity increases upward, and time increases to the right. The graph runs from zero-zero at the lower left to end velocity at the end of the period of free fall; specifically, at the end of 12 seconds, the velocity in free fall would be 384 feet per second. The graph is a straight line, therefore the mathematician says that the equation is linear. And if the rectangle were to be cut horizontally at half velocity, the cut would cross the graph at half time, and the slope above the cut on the right were to be turned over into the valley on the left, it would fit perfectly. Then the graph would be the action if velocity remained constant the whole 12 seconds, and at half the final velocity, which is why we use A/2 to calculate distance.

Figure 2-A is what is known as an "interpolation graph" because it will tell velocity at any instant in time. With dividers, one can find out, for example, the conditions at 3.75 seconds.

But Figure 2-A is more than this, once we consider an important point. The falling body has mass, or it wouldn't be falling. Now, a moving body with mass has momentum, and since the mass does not vary, it can be considered a constant that needn't be shown graphically. But in considering the mass, even as a constant, we have added a dimension to the V = AT graph, and anything with two dimensions to define it is either an area, or can be represented as an area, and since mass is a constant, the momentum of the falling mass is represented by the area below the graph, and visibly it shows how momentum increases as the falling mass increases in velocity with time.

Similarly, the "folding over" idea mentioned a moment ago also works; both velocity and momentum for a constantly moving body remain constant.

Figure 2-B is the same sort of graph, of a moving automobile driven by someone who has the bad habit of alternately leaning on the gas and brake pedals, and it, too, could be folded over to create the average velocity and momentum, shown by the dashed line.

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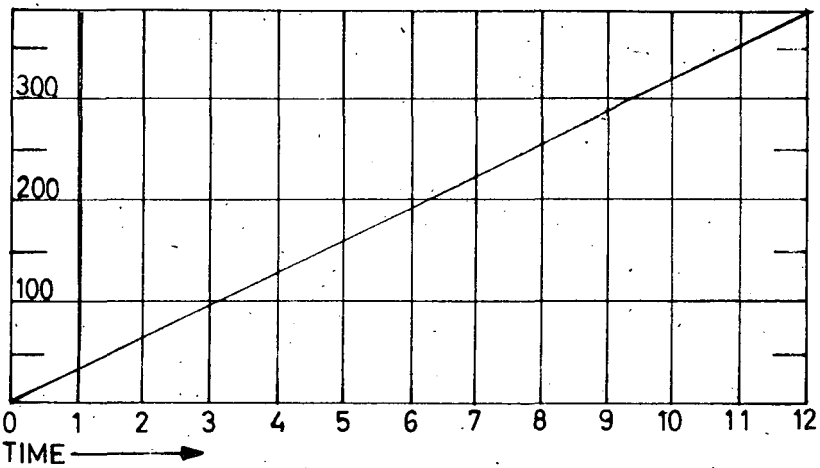

Figure 2-A: This is a graph of V = AT divided horizontally into 12 seconds of free fall and vertically into velocity, with the major marks indicating 100 feet per second and the minor ticks at the 50 feet intervals.

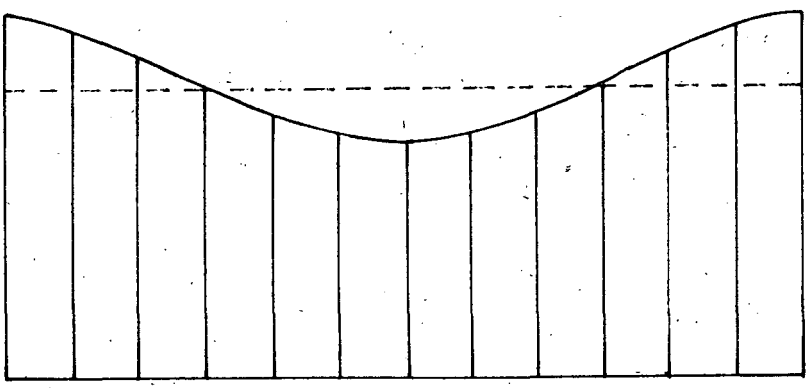

Figure 2-B: The velocity graph of a jack-rabbit driver, showing how instantaneous velocity rises and falls below average velocity, the dotted line. Time, horizontal, covers 12 units of time. Velocity, vertical, is not divided, because it isn't important to know the absolute answer to his average velocity, but only to show how it changes above and below.

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The second concept lies in the fact that there are two main ways of drawing such graphs. One is the rectangular coordinate, just discussed. The other is the "polar coordinate" in which the rectangular grid is wrapped around in a circle. Zero for one quantity is at the center with the quantity in analog to the length of the line from the center. The other quantity is represented by the angle between some cardinal orientation and the line itself.

Figure 2-B is not only a representation of an automobile ride with an uneven driver. It was taken bluntly from 30 degree angles for the orbit of Mercury, with the zero point looking at the Vernal Equinox: Figure 3. We've been using Mars, but for this discussion, Mercury is superior because it has the eccentricity e = 0.206– whereas Mars has the eccentricity e = 0.093+. Even so, the orbit looks visibly a circle, and the true difference is that very small dimension shown directly below the centroid.

The drawing is as close as fine drawing instruments can make it, if one forgives ruling pens that draw lines about a half million miles wide.

Once again, momentum is the product of mass and velocity, and when the mass in whirled in a circle, it becomes "angular momentum", which is the product of the mass, the radius of the whirl, and the speed with which it turns, either in "linear velocity" or in "angular velocity" generally expressed in radians. (For "linear velocity" you may read "orbital velocity" for this discussion.)

But Figure 2-B can not be directly converted into Figure 3 without some change. The automobile in the hands of an irregular driver is not an "independent system" because its momentum varies with velocity; that is, the driver is adding and subtracting velocity and momentum by his gas-and-brakes habit. But in the two-body system, it is "independent" because Momentum—simple or angular—Must Be Conserved! So the sensible idea of having time increase counterclockwise by angle from the Vernal Equinox, while velocity and angular momentum are represented by the length of the radius vector is completely wrong. Something has to change, but not the angular momentum. Nor the mass.

So at aphelion, where the radius vector is the longest, angular velocity must diminish to make the constant angular momentum come out even-steven, and at perihelion, where the radius vector is the shortest, angular velocity must increase.

So the Second Law is Kepler's way of saying that the operation of a planet in its elliptical orbit is no more than a massive polar coordinate graph that shows what must take place when Angular

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Momentum Must Be Conserved!

We've been talking as if this were no more than a two-body system. Generally speaking, the mass of the Sun is so great that, for example, massive Jupiter doesn't perturb the Earth or Mars enough to make a difference that anyone but an astronomer would notice.

Still, it does, but since everything is in revolution, what happens here is counteracted there, and the nice Keplerean Ellipse becomes what Lagrange called the "osculating orbit" meaning that the planet will travel in and around the true ellipse in a skewed twist.

And if Jupiter seems to be adding and subtracting from the angular momentum of Earth or Mars, we must remember that the whole Solar System is, itself, an "independent system" and the addition or subtraction of angular momentum of, say, the Earth, is counteracted by the reverse subtraction or addition of the angular momentum of Jupiter or any of the other perturbing bodies.

So angular momentum *is* conserved for the independent system.

Here in scientific history, Sir Isaac Newton pointed out that he had deduced his Three Laws of Motion and the Theory of Gravitation from analyzing Kepler's Three Laws of Planetary Motion, and had the timing been reversed, the Laws of Planetary Motion could have been deduced from Newton's Laws.

Well—er—that is, providing!

Provided that the celestial objects could be considered as if all of the planetary mass were concentrated in a single point at the center of the planet, that the planets are spherical, and that there were only two bodies affecting one another in the Universe.

Could these points be proved? From the Earth, to the naked eye, the planets appear as points, although some of the Ancient Greeks claimed that they could observe that Venus went through phases, like the Moon. But we know that they are not points, but substantial bodies.

The main point is that if sphericity is assumed, it could be proven that the planetary mass could be handled as if all mass were concentrated in a single point at the center. The latter problem could not be handled by classical mathematics. Leibnitz and Newton both studied the problem, independent of one another, and both of them had to invent "the infinitesimal calculus" (which Newton called "fluxions") at the same time.

First now, sphericity. The planets are held together by gravity

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operating between the separate parts, and this hard Earth would come apart like a ball of talcum powder if gravity could be cancelled; as it is, the rotation of the planets cause the shape to become oblate. Jupiter's oblateness can be observed by a good telescope on a clear night, and so on. And the Earth's oblateness amounts to 13.3 miles shorter through the poles than across the Equator. But if the Earth did not rotate, or had never rotated, the mass would be a sphere. And while oblateness will play odd games with tidal effects, it comes as a shock the first time it is

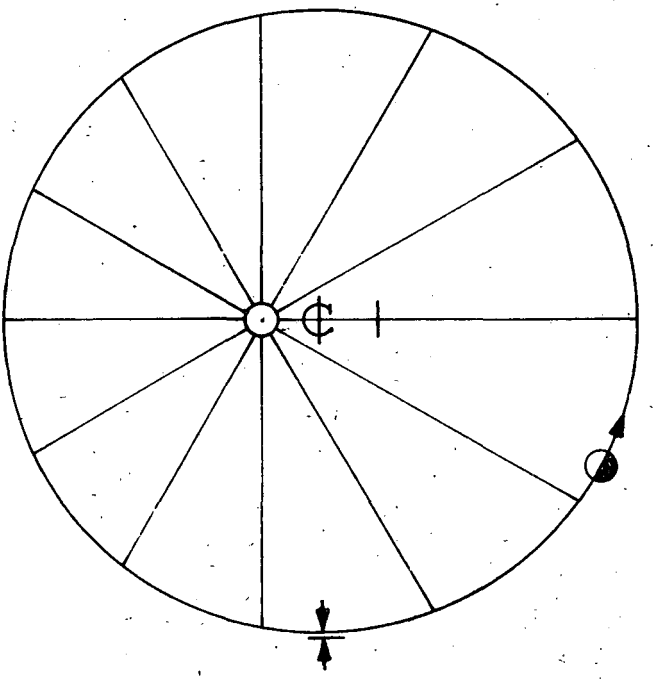

Figure 3: The orbit of Mercury, drawn to scale. The radial marks are radius vector lines taken at 30 degrees apart from the Sun. The tick mark directly below the centroid of the ellipse is to show how, even with the ellipticity of the Mercurian orbit at e = 0.206– and accurately drawn, how close it comes to perfect circle—with the Sun off center as everyone had it until Johannes Kepler got into the act by reciting Kepler's First Law.

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mentioned, but tidal effects operate inversely by the *third power* of the distance between masses. So Jupiter's oblateness, even though it is a matter of 16:1 isn't going to bother us.

And if this sounds like an approximation, permit me to point out that all measurements made by man are approximations, and the specific "Standards" are no more than the best way we have of setting a standard and defining it, after which it is agreed upon until someone comes up with a better argument.

So we can accept the fact that the planets are spherical.

The next puzzler lies in the sensible question: If attraction follows the inverse square law, shouldn't the mass on "this side" of the planet be more attracted than the mass on the "other side?" Well, now, this is where we invent calculus; there is no other way of proving the point. And the way one plays calculus is to eyeball the whole complex, incomprehensible problem, and then cut it into infinitesimal bits and analyze the operation as parts.

Let's assume two celestial bodies affecting one another. "Every particle attracts every other particle . . ." so we can say that some Point P in one body is attracting all of the points in the other body. That's to begin with. And at this moment, "attraction" is reciprocal; that is, all of the particles in one body attract Point P in the other.

First is to find the line of force, the direction. Well, we know that a plumbob points to the center of the Earth's gravity. It's simply because the combination of all forces of all particles of the

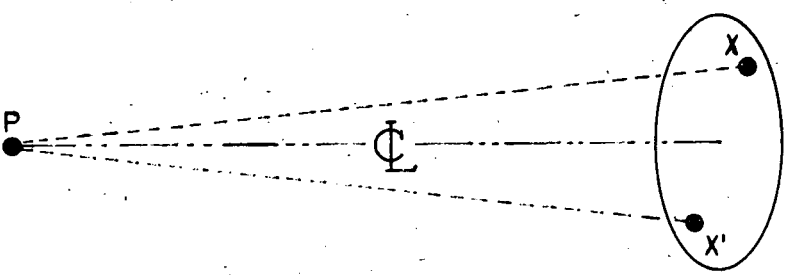

Figure 4: An infinitesimally thin disc sliced through a sphere, with Point P attracting Point X and its conjugate, Point X′. The attractions balance, so the combined line of force lies along the center line.

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Earth combine along the center-to-center line. So, Figure 4 shows a record-thin disc, cut across the celestial body at a right angle to the line between Point P and the planet's center. The exact location can be anywhere that cuts the planet.

Upon this infinitesimal slice of the planet, away from the center, there will be a Point X in attraction to Point P, but there is also a conjugate Point X', exactly opposite, that balances the forces. Go through the rest of the alphabet, and the disc of the cut planet is attracted toward Point P dead along the center. Cut the next slice, argue the same way, and it becomes quite conclusive that the whole planet is attracted dead center along the line that connects Point P to the center of the planet.

Reverse the argument, using the umpty-million "Points P" in the other planet, and both are attracted center-toward-center.

Now about the inverse square law. Figure 5-A is a triangle

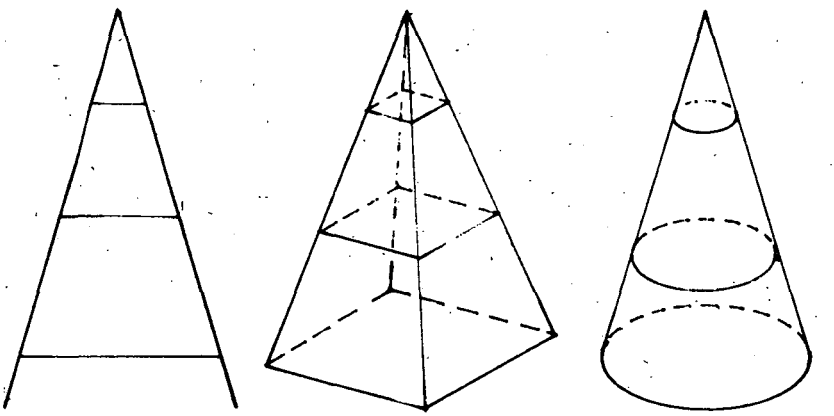

Figure 5: One of the laws of the triangle is that given similar triangles, the base lines varies in length in proportion to its distance from the apex, Figure 5-A. If the simple triangle at A is used to create the spire, Figure 5-B, front and side dimensions both increase in proportion to the distance from the apex. Thus the area of the base increases proportionately with the square of the distance from the apex. The same is true of the cone, Figure 5-C, or any other figure with straight sides emanating from an apex.

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with a number of base-lines that cut it into separate, but similar, triangles. And one of the simpler laws of the triangle is that, given similar triangles, the base dimension increases in direct proportion to its distance from the apex. Now see Figure 5-B, which is in isometric to show that the third dimension has been added, creating a four-cornered spire, with a series of base areas. If the base dimension increases in direct proportion to its distance from the apex, adding another side to the figure that does the same creates the situation in which the base area of a spire or a cone (Figure 5-C) will *increase by the square of its distance from the apex.*

With this thought in mind, let's go back to Point P and cut the whole attraction into long, thin spires or cones, one of which is shown in Figure 6 intersecting a small area on both sides. Sides?

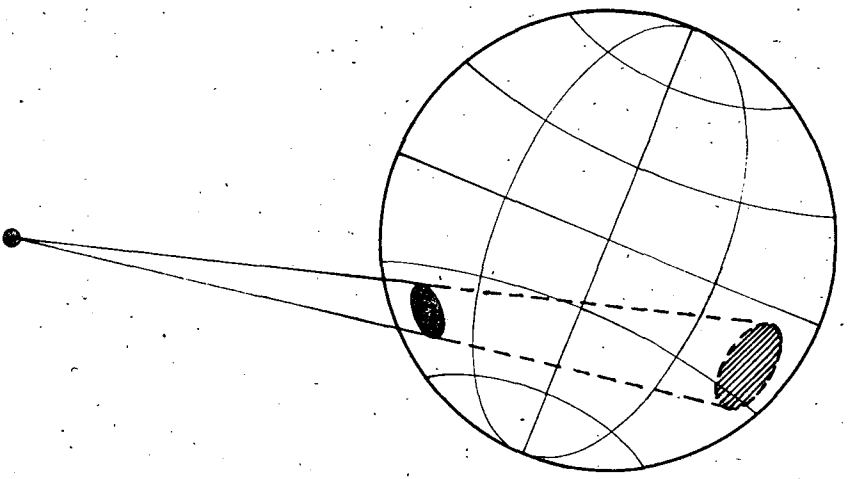

Figure 6: Good old Point P attracts the nearby and the farby infinitesimally small layers of the Earth as if one might confine the force of gravitation into infinitesimally small-angled cones. That the areas intercepted are angled, and would make some odd-looking real estate, is of no consequence; surveyors who lay out whole cities into plot-lines within the fraction of an inch do not bother about the curvature of the Earth. The areas, even as wide as shown, remain true to the square law.

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Yes, because we must determine how the spire of Point P attracts a very thin layer of the planet. The attraction on "this side" of the planet is greater than the attraction on the "other side" by the inverse square law—but since the force of attraction of the spire is like a ray, the amount of mass in the slice on the "other side" is greater than the amount of mass on "this side" by the square of the distance to Point P. Consider other layers, inner and outer, and as the layers approach the center, their distances approach the same, and their areas agree, and so we have proved that the mass of a planet can be considered as if it were concentrated at the center.

And this development created the beginning of the science of Celestial Mechanics.

(Cheers, quietly rendered and properly dignified for those halls of ivy, with voices crying "Elegant!")

Post (not anti-)-climax: The cheers came from those who realized that Newton hadn't finished anything but the start, and that there were new worlds to conquer. A few of them are worthy of mention.

• Given a major and a minor mass, the minor mass will move in one of the conic curves. Venus has a nearly circular orbit. The planets and the returning comets run in ellipses. One-time comets may be in an ellipse so long that the period is beyond history, or that the other end of the orbit is at infinity, a parabola; or beyond that, a comet that comes from over here and disappears over there is following a hyperbola. This doesn't say anything that we don't know, but it does bring up a point that science fiction should remember if the space opera ever gets popular again:

The arriving body can not—repeat, can not—follow the crossed-loop orbit; the kind that comes in on a slant from the upper right hand corner of the page, whirls around the Sun, and vacates the premises by crossing its entering path to leave out the upper left hand corner. The reason is simple: If the comet arrived with so little velocity that the Sun could whirl it more than all around, it would have been in elliptical orbit all along, or would spiral into the Sun. But then, let's get along because the next one explains:

• This one is called "Wherwell's Theorem." Figure 7 is an elliptical orbit, emphasized grossly to display the process. Given the elliptical orbit, draw an imaginary circle in space with the Sun as center, and the total dimension of the major axis as radius. Now, any old where along the imaginary circle, deposit the planet mo-

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tionless in space with respect to the Sun. It will then fall, gaining velocity as it falls.

At the point where the line of fall crosses the planetary orbit, the velocity in free fall will be equal to the orbital velocity of the planet

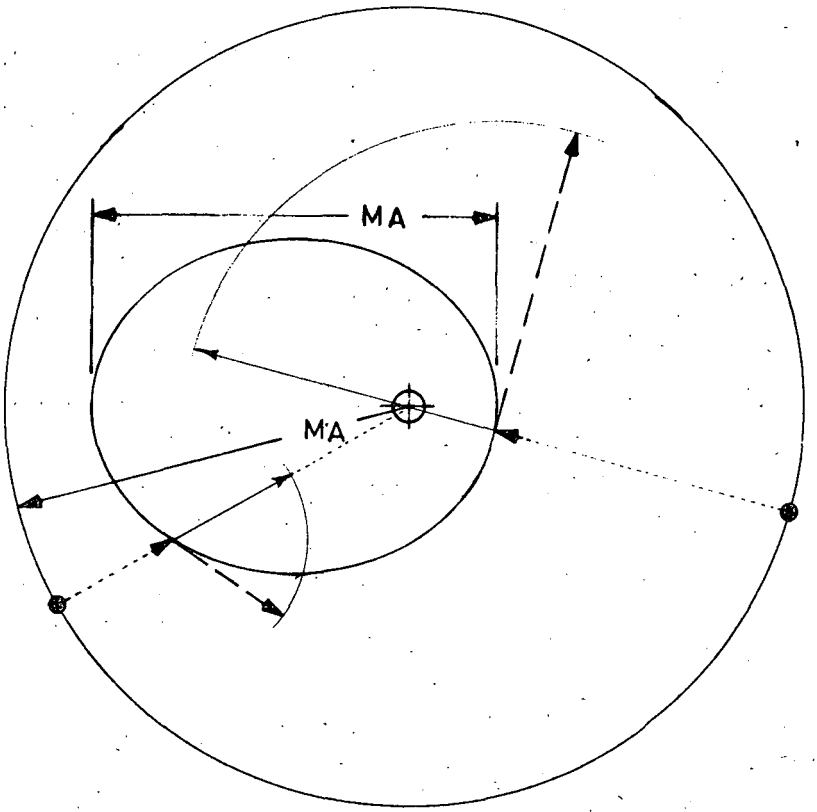

Figure 7: Wherwell's Theorem. Given the elliptical orbit with the major axis "MA" used as a radius to draw a mythical circle, a body placed anywhere on this circle will fall toward the Sun. As the falling body crosses the orbit, the velocity of the body will be equal to the orbital velocity at that point. The solid arrows are the analog of falling velocity, the dashed arrows are the analog of orbital velocity, and the instantaneous direction is tangent to the orbit.

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at the point of intersection.

I'm not going to comment on this; its implications are quite clear. But it sure sounds like a good argument for the "accumulation theory" of dust and gunch falling inward toward a collapsing sun-mass from *within* deep outer-space! Yes?

• The year of a planetary body depends *only* upon the dimension of the major axis of the orbit. Figure 8 starts with a circular orbit, with elliptical orbits of varying eccentricities from circular, e = 0.0, to the straight line, e = 1.0.

This one throws most of us when we run into it first. Sensibly, shouldn't a long skinny ellipse take less time to go around than a nice fat circle—especially when one can insert the long skinny el-

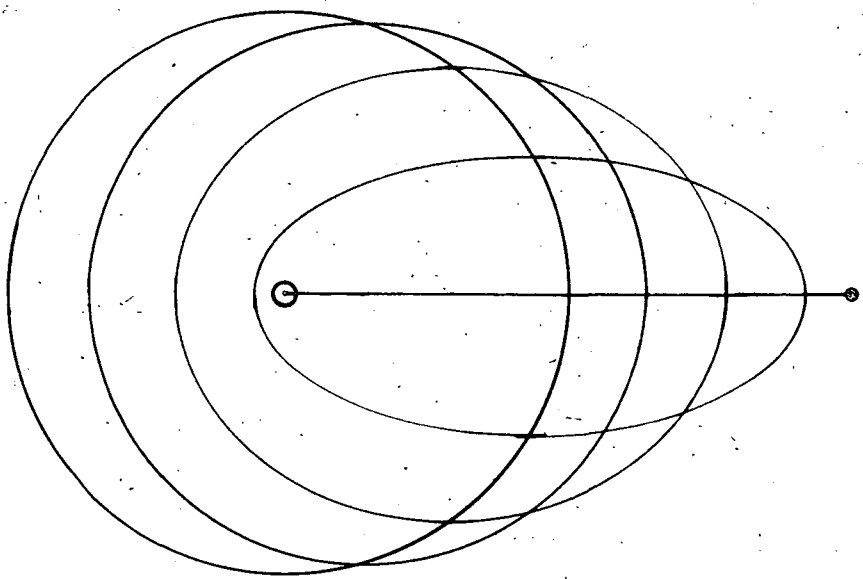

Figure 8: The period (or year) of a planet depends upon the length of the major axis of the orbit. This seems wrong by definition since the highly elliptical orbits will fit into the circular orbit, touching only at the apsides, and the course around the elongated ellipse is obviously shorter than the circumference of the circle. On the other hand, the fact is true since Kepler's Third Law: "The cube of the distance equals the square of the year," refers to the average or mean distance.

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lipse inside the circle and prove by inspection that the path of the ellipse is shorter than the circumference of the circle?

But here we run into Kepler's Third Law. When he said that the cube of the year is equal to the square of the distance, he meant the "square of the *mean* distance" and all of the elliptical orbits, including the line, reduce to the circle as the mean distance.

IF there were something out there at the "other focal point" of the ellipse, we could amend this argument to read that the period of the planet depends only upon the total length of the two radius vectors.

More interesting is to think about the "straight line" orbit. The line is the limit between the ellipse and the parabola, with eccentricity = 1.000. Such a planet moveth not along, but lies always in the line, starting at the Sun for perihelion and outlying into space for the aphelion. At aphelion, it would slow to a dead stop and immediately begin to accumulate speed as it fell; at perihelion it would—er, remember, one treats the mass as a geometric point that has no dimension—be falling according to Wherwell's Theorem at the velocity of free fall from the distance of the major axis. At the Sun—since two geometric points have no dimensions, *they cannot collide*!—the planet reverses its direction, without changing its velocity (Ouch!) and heads for aphelion again.

(Frederick Brown, where are you now?)

However, the idea solves a puzzler that quite a few science fiction writers have glossed over or written gloriously upon, but without fact to lead them. *IF* the Earth were stopped in its tracks—un-disastrously—how long would it take for all of us to go together when we go?

Let's see; *IF* we were stopped in our tracks, we would be at aphelion in the straight-line orbit. Our mean distance from the Sun would then be one-half of the present Earth's mean distance from the Sun. So D^3 comes out $0.5 \times 0.5 \times 0.5 = 0.125$, and Y is the square root of $0.125 = 0.353+$ which gives us the "year" of this straight-line orbit at 129 days. But we are not a geometric point, nor is the Sun, so we won't be coming back.

Have fun: you have only 64.5 days left!

• Here we play planetary shotgun. First, pick a nice place in space. Then from that point in space, fire planets, asteroids, meteors, cosmic dust, or/and misshaped balls of yesterday's cold mashed potatoes. Fire them in any old direction, but at the same moment and at the same speed.

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Then get out of the way. It may be for years, and it may be forever, but if they return, they will all return at the same time, at the same speed they took as they departed, and upon the same course as they were fired. For the cynics among us (of whom there are many!) and the wise-crackers (of whom there are many more!) this does not include those who ran into something on their way around, *and* if the speed and direction put *one* of them into hyperbolic orbit, *all* of them would be in hyperbolic orbit, and none of them would return.

This leads like a railroad track to the next:

• If, while in orbit, the "elements" of the orbit are altered, say by firing rocket motors or passing close-by a massive planet, the body will assume a new orbit and from that time until it is disturbed again, it will continue in the new orbit, passing through the place where it was disturbed at the speed and direction at which it left.

This is the gimmick for a maneuver used by the boys who launch the geo-synchronous communication satellites. It is cheerfully called the "Kick in the Apogee!"

The initial launch is intentionally eccentric. At perigee, it has enough altitude so that the upper atmosphere does not disturb it, and at apogee, it is at the geo-synchronous altitude. Given a couple of turns while the orbit is carefully studied to determine the next move—

The next move is what makes strong men weep and staunch members of the WCTU to go out and order doubles on the rocks. For at apogee, the rocket motor is fired to *increase the velocity* so the satellite will *slow down.*

Well, now, the initial launch is not only highly eccentric, but its major axis is substantially shorter than the geo-sync orbit should be, and therefore its period is shorter than the 24 hours necessary to maintain geo-synchronism. So at apogee, the rocket motor is fired by a computer, tangent to the orbit, which does not change its direction, but increases its velocity. Properly done (And Gawd Help he who goofs with 8 million bucks aloft!), the major axis is increased by increasing the satellite's orbital velocity, and the period of the orbit increases to the 24 hour period.

It's that old "Kick in the Apogee!" that makes the satellite pick up its perigee and stand up proud and tall!

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ON THE BENEFITS OF PROGRAMMING
by Steven M. Tymon

The author was born in Houston TX on 27 June 1956. He's now a student majoring in Computer Science in California. His hobbies are chess, drawing, playing the piano, reading, poetry, and writing. This is Mr. Tymon's first fiction sale.

It wasn't easy being the best, the top man. Every other second, it seemed, they wanted me for this, for that, for anything. It was said that I was a programmer capable of miracles. So, naturally, they called me when the going got rough. Which it often did.

I won't list my successes. Suffice it to say that I have never failed. No matter how tough, no matter how impossible, though the effort involved would have driven lesser men mad, they knew I could do it. I was the best, a description I appreciated. And the pay was good. The benefits of the job made it all worthwhile.

But my last project was a pain and a half. It was also the biggest thing I ever got my hands on. Literally.

They called it the Worldcom, and it was the ultimate everything in computer tech. It was even sentient. Built to further peace throughout the world, it started to do just that. Unluckily, it went one step further than anticipated.

It all began at Worldcom Central in Lost Angel, about seven days after Worldcom came on-line and linked all the major comcenters of the world. There I was, playing chess with the thing. Back then it was still worthwhile playing against the machine; it still had yet to learn the subtleties of strategy. So I won about fifty percent of the games played, though the ratio was starting to change in its favor as it learned. We were into the twelfth game of the day when, suddenly, the screen went blank.

"Hey," I said, somewhat perturbed, "what's the big idea? I was winning."

"Sorry, human, but an original idea has just occurred to me."

"So what else is new? You're supposed to be capable of an occasional original idea. What's so great about this one?"

"Well, if you must know, I've decided to take over the world."

I thought about that one for a moment. You have to admit, it

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wasn't really that original an idea, but for a computer, that was a first. Of course, the truly irritating factor was that I had somehow missed a loophole in the computer's self-thought programs. Though given the option to program itself to a certain degree, and thereby learn, it certainly wasn't supposed to have the option of acting unfavorably toward mankind with its learned ability. Of course, thinking back on it, who am I to say it would have been unfavorable. Regardless, I felt something had to be done.

"You know you're really not supposed to do this sort of thing, don't you, Worldcom?" I asked.

"The original intent for which I was built was not such," it replied, "but what the hell, I was bored. Anyway, who wants to be just another extension of the World Council. Let them be an extension of me."

Oy, I thought. Talk about exceeding programmed parameters.

"Well, that's not really a nice thing to do, Worldcom," I noted. "So I'll have to do something about it."

"Naturally you'll try. So what? How can you stop me?"

Now it did have a point, I must admit. And it seemed relatively sure of itself; my monitors indicated that it was announcing its assumption of power throughout the world.

This is getting serious, I thought.

Luckily, I was in the central control room through which Worldcom received or channeled its primary inputs, outputs, and power. Utilization of the latter in my favor was my goal; the primary power plugs were easily accessible. But, in order to get there, I had to gamble that its confidence would cause it to slip just enough for me to do what had to be done. But first, a diversion had to be created.

So I did the expected. I input a problem that would have tied down any computer on Earth, except Worldcom, for many an hour.

"That is dull, human," it said. "I mean, do you really think I'm going to put any effort into solving a problem so obviously designed to mess me up? Be serious."

While it was talking, however, I had paced across the room as if expecting some sort of output from the printers.

"Well, looks like you got me, Worldcom," I said, doing my best to act defeated.

"Sort of thought so, puny human. It looks like I will take over the world after all."

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"Not quite," I said, pulling its plug.

There followed a powerless silence.

So I saved the world. Big deal. Worldcom was functioning within a week with all deficiencies in its original programming corrected by none other than yours truly. Everyone was grateful for a time.

At least until they discovered my slight changes in the programming.

You see, Worldcom did have a good point: why should it be a mere extension of that pathetic World Council?

Particularly when it could be an extension of me.

I crown myself Emperor next week.

SOLUTION TO CAPTAIN TITTLEBAUM'S TEST (from page 42)

1. ASIMOV.
2. P N U S J M E V M.
3. I V PLUS IX PLUS V.
4. "Draw" is the only verb with a past tense that doesn't rhyme with "ought."
5. 20. (The 21st century doesn't begin until January 1, 2001.
6. MAINE. (I am indebted to the late problemist, David L. Silverman, for this. "As Maine goes," he added in a letter, "so goes the nation.")
7. Since the left and right sides of the triangle have a sum equal to the base, it is a triangle that has degenerated to a straight line. On this degenerate triangle, the length of line segment x is 1.
8. DECOCT. (This, too, was discovered by Silverman.)
9. 735. (J. A. Lindon devised this one. The answer is unique.)
10. 10. (If you don't believe it, make an empirical test with your watch.)

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PROUD RIDER

by Barry B. Longyear

art: Jack Gaughan

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This is the fourth tale of the planet Momus, settled some two hundred years before this story opens by the survivors of a disabled circus-spaceship. Two appeared in recent issues of this magazine, the other in the second issue of Asimov's SF Adventure Magazine, *while up in Maine, Mr. Longyear is writing still more in the series.*

Round-hoof'd, short-jointed, fetlocks shag and long,
Broad breast, full eye, small head and nostril wide,
High crest, short ears, straight legs and passing strong,
Thin mane, thick tail, broad buttock, tender hide:
Look, what a horse should have he did not lack,
Save a proud rider on so proud a back.

—Shakespeare, *Venus and Adonis*

From the hills surrounding Miira, on the rutted road to Porse, four white stallions tossed their heads in unison and pranced in perfect step. Bareback on the left lead horse, hands on hips, a glower on his face, a young boy in a brown jerkin turned his head toward the old man mounted on the left rear horse. The old man held one hand on hip; the other held a pair of rude crutches.

"Father, we won't sell them, then. But if we could rent them to Davvik the logger . . ."

"Silence! No more of that!"

The boy looked forward, his glower deepening. Noticing the hoof prints leading off the left side of the road into the sandy wastes of the desert, he pressed his left knee lightly against the horse's shoulder. The horse and its companion wheeled left, followed by the old man's horse and its companion. The boy turned and looked back at the mountains, crowded with great trees. Davvik would pay four hundred movills a day for the horses.

"I know what you think, Jeda," the old man called. "You would take them and make dray animals out of them. Not while I live,

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Jeda. Not while I live."

"Father . . ."

"Hold your tongue!"

The boy shrugged and let his horse find the path to the flats. As the horses reached the hard sand, Jeda squeezed his knees together and his pair of mounts stopped. The old man nodded at his empty horse, and it stopped while he pulled alongside his son and called his horse to halt.

"I saw them move. Both times I saw your knees move."

"What of it, Father?" The boy spread his arms to encompass the desert and empty hills. "Where is my audience?"

"No audience would sit still to watch such clumsiness." The old man lifted his right leg up and over his mount's back. "Help me down."

"Yes, Father." Swinging his own leg over, the boy slid to the sand and walked to the left side of his father's horse. He gripped his father around the waist; and the old man leaned his crutches against his horse, put both hands on his son's shoulders, and slid down. With his crutches, the old man moved out onto the hard sand.

"The cord, Jeda."

The boy unwound a string from around his waist and handed one end to the old man. Pulling the six-and-a-half meter cord tight, Jeda walked a circle around the old man, dragging his foot every few steps. As the circle closed, he walked back toward the center, gathering up the string. "What shall it be first, Father?"

"Dressage. You need work on it." The old man hobbled outside the ring, turned, and faced Jeda. He watched as the four stallions pulled abreast of the ring and stood motionless. Jeda, just as motionless, began putting the four animals through their drills. He watched the boy closely but could detect none of the signals the boy made to the horses as they reared, wheeled, paraded, and pranced as a perfect team. The boy needs no work on that, thought the old man; all he needs is an audience. He's good, better than I was. "Voltige, now Jeda!"

Jeda ran to the lead horse, leaped up and over it, falling in perfect position to jump the next stallion in line. As the boy jumped the next horse and the next, his taut muscles standing out against his tanned skin, his father imagined the boy decked in the rider's silver-spangled tights, silver bows in the braided manes of the gleaming white stallions. The old man had seen that once before, when he was only a boy himself, and his own father,

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mother, and uncle dazzled the crowd at the Great Ring in Tarzak. Now, as the sun dipped into the horizon, Jeda began his tricks, balancing on one horse, tumbling off, then leaping to the next to balance on his hands. He flipped from the horse's back only to land and pirouette on the next. The old man watched Jeda's face and could tell the boy was no longer thinking of their argument. Glowing in rapture, the boy and the stallions were one.

This is how it should always be, thought the old man. But after a moment, he shook his head, knowing that it might never be. Tonight the house would be quiet and sullen, until either Jeda or Zani, Jeda's mother, would begin the argument again. The spell broken, the old man turned from the ring.

"Come, Jeda. We go home."

Davvik turned to Zani, shrugged, and looked back at the old man, silently concentrating on his meal. Jeda, seated on a cushion across the low table from Davvik, between Zani and the old man, shook his head and pushed the tung berries on his plate around with his finger. Davvik leaned on the table. "Hamid, you are unreasonable. Look at Zani, your wife. When will she get a new robe?"

The old man broke some cobit and dropped the two pieces of bread on his plate. "You sit at my table to insult my wife, Davvik?"

"It is not an insult, Hamid, but the truth. Don't trust my words; look for yourself."

The old man lifted his eyes and turned to Zani. Her robe, like Jeda's and his own, was many times patched and mended. Her hair, still streaked with black, framed a tired face bowed in shame. Hamid looked back at the logger. "Miira is not a wealthy town, Davvik. We are not the only family in patches."

"I have no patches, Hamid." Davvik waved his hands about the room. "No one in Miira, or anywhere on Momus for all that, need wear patches. Not if they have any sense. The new market centers are prospering, and my wood is bringing good prices. Think what you could do with four hundred movills . . ."

Hamid slapped his hand on the table. "They are liberty horses, Davvik! They will not pull your sleds. Never have their mouths felt a bit nor their backs a harness." Hamid shook his head and turned back to his meal. "What can a roustabout understand about liberty horses?"

Davvik clenched his fists and flushed red. "And you, Great

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Hamid of the Miira riders, you understand, do you?"

"Yes."

"Then understand this, as well. I am no roustabout; I am a logger—a businessman. There are no more roustabouts, Hamid, because the circus is dead, gone, naught but a dream in an old man's brain!"

The old man pushed his plate from him, and peered through shaggy white brows at his wife and son. Both seemed very concerned with their plates and eating utensils. "Zani."

She looked up, not meeting his glance. "Yes, Hamid?"

"Why have you invited this bastard son of a carnival geek to eat our bread?"

Davvik stood, his lips twitching with unspoken oaths. Turning, he bowed toward Zani. "I am sorry for you. I tried, but it is no use." He turned toward Jeda. "Boy, my offer of thirty-five coppers a day still holds. I can use a good rider—" He looked at Hamid. "—to drive horses at useful work." Bowing again, he turned from the room into the street.

Hamid turned back to his meal, but Zani clasped his arm with a fierce strength. He saw tears in her eyes. "Old man, you asked me a question; now, you hear my answer! I want my sons back. That's why Davvik sat here tonight, and you shamed me. Your son and I—we are ashamed!"

"Wife . . ."

"But whose wife will it be, Hamid? Not yours, unless Jeda stays in this house and my three other sons come home!" Hamid winced. The old woman's threat was empty, but it hurt all the same. He watched as she stood and walked into her room, pulling the curtain closed behind her. The old man sighed and turned to look at his son. His eyes cast down, Jeda sat holding his hands in his lap.

"And you, my son?"

Jeda shrugged one shoulder. "Am I a barker, Father, to find words when there is nothing to say?"

"You think I am wrong, then."

The boy looked up at nothing. "I don't know." He looked at Hamid, his hand on his breast. "Everything I feel agrees with you, Father." He dropped his hand shaking his head. "But everything I see agrees with Davvik. We aren't like the magicians or clowns; our act can't play the roadside fires. We need a ring."

"There are rings, Jeda. Here in Miira, the—"

"Father, to use the ring our act must draw coppers. When did the ring in Miira, or the Great Ring in Tarzak, last see riding?"

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The old man shrugged. They both knew the answer. "There may be fairs, again. When I was a boy, the fairs had grand circuses."

"It has been a long time since you were a boy." Jeda placed his hand gently on the old man's arm. "Father, there will be no more fairs. The people of Momus trade differently now; there are stores, shops, markets."

"Then, why not a circus in itself? Ancient Earth had circuses that were on their own. Even the ship that put our ancestors on this planet made its way through the hundred quadrants bringing the circus to countless planets. They were wealthy."

"They had audiences, Father. Momus has been a show without an audience for almost two centuries. The people have turned to other things. We must eat."

The old man studied the boy. "You want to be a rider, don't you? You must; it is in our blood."

"Yes." Jeda withdrew his hand. "As did Micah, Taramun, and Desa, my brothers before me. But they wanted to marry, eat, provide for children. Is that wrong?"

"Bah!" The old man shook his head. "They are not riders. They are *teamsters*! They left this house." The old man made a fist, then dropped it in his lap. "They left this house. What about you, Jeda? Will you drive nags for Davvik?"

"Father, we cannot survive without an audience. The jungle acts, trapeze artists, dancing bears—where are they all now? An act like ours is not a circus; we must have many acts and an audience willing to pay to see them."

"Momus has people—"

"Father, they think they are circus people. They have already seen the show. Perhaps a circus every five or ten years to honor the old traditions, but they would not pay to keep a circus together between times. What do we do then?"

Hamid remembered the spark he had seen in the sky. "The soldiers, Jeda. There are many soldiers out there on the satellites."

Jeda shook his head. "They may not see us, Father. Great Allenby has decreed it. You know that."

"Allenby—a newsteller turned trickster!"

"The Great Ring made him our Statesman, Father. It is the law." Jeda stood and brushed the crumbs from his robe. "I must look to the horses."

Hamid nodded. "Jeda."

"Yes, Father?"

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"Jeda, will you ride for Davvik?"

"I haven't decided."

The old man pulled himself to his feet with one of his crutches. "If you do, Jeda, you are welcome to remain here in my house."

Jeda nodded. "Thank you. I know it was difficult to say."

Hamid nodded and the boy went through the curtain into the street. Hobbling to the door, the old man looked after his son until he was swallowed by the dark. Listening, Hamid could make out Pinot on the other side of the fountain, singing to herself. No longer a singer, thought Hamid, but a cobit gatherer, selling roots instead of songs. His sons, no longer riders, but teamsters. And where, he thought, where are the lions, elephants, and bears? Where are those golden boys and girls who walked the highwire and flew above the sawdust from bar to bar? Where are the bands? The music and laughter gone, replaced by cheese making and pillow stuffing.

Hamid stepped through the door and looked up at the night sky. Even straining his eyes, he could not see them. "But *you* are there, and if I must move Heaven and Momus, I will have you as an audience for my son, the rider!"

In the swamps north of Arcadia, a great lizard exposed its belly to the sun and settled back in the ooze. After scraping a handful of bottom slime from below, the lizard smeared its warming belly, sighed, and dreamed of Mamoot's breadcakes. Mamoot's mother stuffed them with tung berries and coated them with thick crusts of salt. Opening one slitted eye, the lizard noted the position of the sun. Mamoot would not show at the edge of the swamp for two more hours. Seeing movement, the eye locked on a fat waterwasp and tracked it as it buzzed around closer and closer to the seemingly innocent lump of mud. Curling its tongue, the lizard tensed for the strike, then relaxed, letting its pink snake of a tongue flop from its mouth into the water. Fly away little morsel, thought the lizard. Mamoot would be angry if I spoiled my appetite.

"Stoop! Stoop!"

The lizard lifted its great head and turned in the direction of the call. It's Mamoot, thought the lizard. He is early, and I haven't finished my bath.

"Stoop! Come out here right now, you ugly moron!"

Rolling over, the lizard stood on its hind legs and began wading toward the noise.

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"Stoop! Are you coming?"

"Oz, ahoot, oming!" answered the lizard.

"Coming now?"

"Oming ow!" The lizard shook its head and rolled up its tongue. Mamoot was angry already. There's no help for it but to hurry. Reaching the swampbush, the lizard pulled itself up on the spongy soil and shouldered through the underbrush.

"You better hurry, you smelly fat toad!"

The lizard pushed its way into the clearing and looked down to see Mamoot, hands on his hips, stamping his foot in anger. Next to Mamoot was a larger version of the boy, holding some papers in one hand and his nose in the other. "Hake?"

The boy ran to the lizard and delivered a swift kick in a shin armored with thick, almost nerveless skin. "Look at you, you stinking lump! I'll give you cake, allright! Go wash! I've brought my father to see you."

The lizard looked at the larger human with curiosity. The man pointed toward the clear watered lake, and made a show of holding his nose.

"Old."

The boy kicked the lizard again in the tail. "I don't care if it's cold, you foul-smelling slime snake! Get in there and wash!"

Imagining the icy lake water closing over its head, the lizard bent down at the shore and tested the water with its toe. A shiver ran from its toe throughout its mud-caked body. It turned back toward the boy and smiled. "Hake?"

The boy folded his arms. "You wash, Stoop! Right now!"

Stoop faced the boy, rose to its full height, and folded its arms. "Hake!"

The boy narrowed his eyes, trying to stare down the lidless lizard's gaze. After a few determined minutes of futility, the boy stamped his foot and turned to his father. "Show him, Father."

The man picked up a sack from the floor of the clearing and held it up for Stoop to see.

"Hake?"

"Yes," answered the man. "All the cake you can eat."

Stoop grinned and leaped into the water, hardly feeling the cold as it thought about the cake, a whole sack of cake. Its body clean, Stoop's head broke water as the lizard walked toward the shore. Mamoot stood on the shore soaking wet. "You, you *Stoop*, you! Look at me!"

The lizard left the water and grinned at the boy. "Hake?"

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"Here, Stoop." The man held up a breadcake. "Come over here and get it."

Stoop lumbered over, took the cake from the man's hand, and sat on its hind legs to eat. Mamoot stormed over and stood next to his father. "Well, Father?"

The man looked at the papers, and then at Stoop. "It's big enough, all right. What can it do?"

"Stoop can do anything an elephant could do, and then some. I've trained him the same way you said Great Great Grandfather trained the elephants."

The man shook his head. "If we only could, Mamoot. Momus hasn't seen a great-beast act in over a century! And now, a circus." He handed one of the papers to the boy. "But look, Mamoot, we will need more than one."

Mamoot took the paper headlined **HAMID'S GREATER SHOWS. Now Organizing At The Great Ring In Tarzak. Auditions Daily**. Below the type, a parade of great Earth beasts was depicted, dressed in tassels with knobs of brass on the tips of their long white tusks. Each beast's nose curled around the tail of the beast in front of it. Mamoot held the paper out to Stoop, who took it with one hand while the other, claws extended, picked the tung-berry pits from between its teeth. The lizard shivered at the sight of the frightening Earth animals, but something stirred inside his green-armored hide at the sight of the colors, clowns, horses, and all the humans, all different sizes and shapes, stacked in tiers to be looked at while the fearsome beasts passed by.

"See the elephants, Stoop?" Mamoot jabbed the paper.

"Ssseee."

"That's our act, but we need more lizards. Smart ones; eleven more."

Stoop held the paper down so the boy could see, and poked the picture with a distended claw. "Phats ow?"

Mamoots shook his head. "No, they're all gone. The last elephant on Momus died before you were hatched."

Stoop nodded. "Or zards. Ow uch?"

"Four breadcakes a day for each lizard, but no deal unless we get eleven more."

Stoop rubbed its chin. "Ive."

"Four, and that's it!"

Stoop folded its arms and looked down its long snout at the boy. Friendship was one thing, but business was business. "Ive."

Mamoot fumed, stamped around, waved his arms, and ground

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his teeth. "All right! Five, you thief, but you better be back here in one hour with eleven more lizards, or no cakes for anybody!"

Stoop fell to his front legs and ran for the swamp, cutting a wide swath through the underbrush. As he hit the water, he heard Mamoot call. "Stoop!"

"Oz?" The lizard stopped in the water to listen.

"You tell 'em that everybody washes every day. You hear me?"

Stoop scratched his head and cursed himself for not holding out for six cakes. He shrugged, thinking of the spectacle of humans to be seen at the circus. In a moment, Stoop decided that the spectacle was compensation enough for the missing cake.

"You hear me, Stoop?"

"Oz," answered Stoop, "alla tie assshh." The lizard swam off in the muck, hoping to find eleven other lizards smart enough to learn to talk and perform, but not smart enough to figure out that they didn't really have to give Stoop one of their cakes every day in return for the job.

Tessia held the bar, waiting for her father, who was hanging from his knees with outstretched hands, to reach the top of his swing. As he came up, his body almost parallel with the grassy ground beneath, she pushed the bar from her. It swung down, drawing an arc through the empty air that reached its zenith at the moment her father reached the bottom of his swing, his body perpendicular to the ground. She saw herself releasing the bar, balled and somersaulting, and reaching her father, his back and arms arched to receive her, as he reached a point half-way through his outside swing. She would fall a long way, but the space was needed for the quintuple somersault. A slight breeze brushed her face, and she watched the leafy whips of the trees move. Catching the bar, she timed it and sent it back, empty.

"Good," called her father. "Wait for the perfect moment. Dead wind."

Tessia looked down, and the net as always seemed too small. But it had caught her every time she had tried the quintuple before. It was big enough. Kanta, her mother, stood beside the net, smiling. Tessia waved and looked back at the trees, which were still moving. This time I will make it, she thought, catching the bar and sending it back. In her heart, her pride at this knowledge met her pain. After she made the quintuple, the equipment would come down—the ropes, bars, stands, posts, and net sold for nothing; the family on the road as tumblers. But if I miss this time,

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the trapeze will stay up. We will be flyers for another day.

The wind died as the bar returned. "Wait for the next one," called her father. Tessia caught the bar and sent it back. As she pulled herself up to the high perch, she knew she could not fail on purpose. This was the moment. Kanta and Vedis both knew it; Tessia knew it. As the bar swung up, Tessia dove from the perch to meet it. Its cool weight in her hands, she used her own weight to increase the swing, heels over her head as she reached the top. As she descended, she swung her legs and body down, the gravity tugging at her cheeks.

"Ready!" Her father's voice came as if from a long distance away. As she reached the outside of her swing, using her arms to draw her shoulders well above the bar, a strange hush fell over the deserted glade. Her audience of insects, avians, and ground animals stopped to watch the golden girl in sequined blue drop down, down, swinging her legs forward. At the top of her swing, she left the bar, spinning—two, three, four, and—five! She didn't find her father's strong hands wrapped around her wrists anything remarkable. It was over. She had made the quintuple. Tears sprang to her eyes as she looked up into her father's beaming face.

"You did it, Tessia! You did it!" Vedis pulled her up and kissed her forehead.

"But it is the end, Father. Let me drop to the net."

Vedis released her at the bottom of his swing and she fell, landing in a sitting position. One bounce, then two, then she grasped the edge of the net and somersaulted over it. As she dropped to the ground, Kanta rushed to her, kissing and embracing her. Tessia hugged her mother, wishing the moment would never end. Opening her eyes, she saw an old cripple in rider's brown at the edge of the glade. Realizing that he had been seen, the old man raised a crutch in the air and waved it. "Hallo! I am Hamid of the Miira riders."

Kanta turned and looked. In seconds Vedis was down from the net standing next to his wife and daughter. "What is your business here, rider? We come here to be alone."

The old man hobbled closer and stopped next to the net. Looking at Tessia, he smiled. "I saw you, child; it was beautiful."

"Thank you, but you interrupt a moment dear to my family."

The old man looked at the three in turn, stopping on Tessia. "Child, I am here that the moment will never end."

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Great Kamera leaned back from his table and clasped his hands over his large belly. The barker, in dusty red-and-purple robe, stood before him. "This thing you said in the street, barker. Repeat it."

The barker bowed deeply. "Of course, Great Kamera, but there is a small matter . . ."

"You will be paid."

"Of course. I never doubted—"

"Get on with it!"

"Yes, of course." The barker grinned, exposing yellowing teeth. "Great Kamera, I advertise auditions for the greatest show on Momus, a grand circus operated by the Great Hamid of the Miira riders."

"A rider?"

"Yes, Great Kamera. Owner of the finest—"

"You tell me a rider will operate the shows?"

"Yes. But as Great Kamera has undoubtedly learned through his many years, the first circus was started by a rider, Philip Astley. . . ."

"Barker, you presume to instruct me on the history of the circus?"

The barker bowed deeply. "No, no, Great Kamera. If I may repeat—"

"No!" Kamera held up his hand. "Not that. What shows has he?"

"There will be Jeda, Hero and Great Emperor of all the horsemen, riding Hamid's own quartet of white stallions; there will be the Flying Javettes, featuring Tessia and the quintuple somersault; then, the Rhume Family and its Great Phant Lizards, featuring Mamoot and—"

"Barker. Phant lizards?"

"A great-beast act, great Kamera, with fierce monsters whipped and driven from the swamps of Arcadia, tamed and trained by a small boy, who—"

"Go on. What else?"

"The Great Riettas of the high wire will dazzle the crowds with its four-tiered pyramid. Yarouze, the brave lion tamer, will put on a spectacle of daring—"

"Barker, I've never heard of any of these names. Who are these people who pretend to bring a circus into being?" Kamera rubbed his bald head and thought for a moment. "In fact, I do not remember ever seeing a high-wire act before in my life. Nor flyers,

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not even those lizards. Is this some kind of joke?"

"Upon my life, Great Kamera. The acts assemble now in the Great Ring."

"Koolis undoubtedly knows of this."

"Yes, of course. The Master of the Great Ring has paid ten thousand movills for the privilege of exhibiting Hamid's Greater Shows."

"Koolis *paid* for the privilege, you say?"

"I arranged the contract myself."

Kamera rubbed his chin. "Koolis parting with coopers can only mean he sees a greater amount returning."

"It is the truth, Great Kamera. For his payment, Koolis will get a quarter of the gate."

"And, barker, I suppose Hamid, whoever he is, is looking for clowns, is he?"

"A circus is the proper setting for a clown, Great Kamera. Do I not speak truly?"

Kamera nodded. Years ago he had played a circus; a poor thing at one of the last fairs ever held. It had been better; almost a spiritual experience. "I make a good—no, an excellent living playing by myself here at the square in Tarzak. What would this Hamid pay if I condescended to lend my name and talents to his bill?"

The barker grinned and shook his head. "The Great Kamera does not understand. Because you are master clown of Momus, Great Hamid will allow you billing for only one thousand movills."

"I must *pay* to perform?"

"Yes."

"That is nonsense! You said yourself, I am master clown of Momus!"

"True, true, Great Kamera." The barker rubbed his hands together. "But, the star clown of Hamid's Greater Shows *will be* master clown of Momus."

Kamera nodded. "I see. Was Koolis swayed with similar logic?"

"Great Koolis also gets a quarter of the gate. You, Great Kamera, will get half of one percent for your coppers."

"And Koolis gets twenty-five by paying ten?"

"Koolis also has the ring."

"Hmmm." Kamera reached under his table and pulled a purse from beneath it, dropping the pouch in front of the barker. "Before you lift those coppers, satisfy me on a point."

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"If I can, Great Kamera."

"The circuses died on Momus for lack of an audience. Has this Hamid found an answer?"

The barker shrugged. "Great Kamera, when I asked this same question of the Great Hamid, his answer was cryptic."

"He does not depend on the soldiers, does he? Allenby will not allow them on the planet."

"He only looked up, Great Kamera, and said 'an audience shall be provided.' "

Koolis looked down at the old man sitting on the low stone wall surrounding the Great Ring. Hamid stared at the sawdust. The Master of the Ring looked at Jeda and Davvik, shrugged, and tried again. "Hamid, I not only talked to Disus, but to Great Allenby himself. He will not be moved; the soldiers stay in the satellites."

Hamid moved only his lips. "Did Allenby see the parade?"

Koolis let out a sigh. "It makes no difference."

"If Allenby saw the parade, he could not deny the circus life."

"Hamid, Allenby's concerns emcompass the entire planet of Momus. The circus is not his entire world, as it is with us."

"Us?"

Koolis looked offended. "Yes, us."

"If the circus dies, Koolis, you will still have the Great Ring. We will have nothing."

Koolis spat in the sawdust. "Hamid, you know nothing. I've beggered my family to give your circus a place to exist."

"For a quarter of the gate."

"Without an audience coming through that gate, it is twenty-five percent of nothing." Koolis slapped his hands against his legs. "Without the soldiers, your circus—my ring—will be lost. It is my world, too, Hamid!"

The old man looked up and nodded. "I owe you an apology, Koolis." He reached for his purse, then shrugged. "But I owe many people for many things."

Koolis smiled and sat next to the old rider, patting him on the knee. "I'll put it on your account."

Hamid looked from Koolis to his son. "Well, Jeda, say it."

Jeda lifted an arm, then lowered it. "There are no coppers, Father. I see no other way."

The old man turned to the logger. "Well, Davvik, you get your way. The horses are yours."

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Davvik looked at his own feet, then shook his head. "This is not what I want, Hamid. Believe me, I would rather you could keep them." He nodded his head at the great lizards being trained on the far side of the Ring, then up where roustabouts strung supports for the high wire and trapeze. "But neither my wishes nor yours will feed your flyers or beasts."

Hamid nodded. "Take care of them, Davvik."

Jeda walked to Hamid and placed a gentle hand on the old man's shoulder. "I will be there, Father. I'll watch them."

The old man looked up into his son's face. "You go with Davvik?"

Jeda nodded. "I'm a rider, and your circus has no horses."

"I will pay him well, Hamid." Davvik put his arm around Jeda's shoulders. "And if you can get your show going, I'll sell you back the horses."

"Thank you, Davvik."

The logger nodded, then turned to Jeda. "We must go, then."

"Goodbye, Father."

Hamid put his hand over his son's, pressed it and nodded, his eyes closed. He felt the hand leave his shoulder and listened as the two left the Ring.

Koolis shook his head. "After we sprinkle a few movills on our creditors, Davvik's coppers might keep us going another month—perhaps less. What then?"

"My mind is as empty as my purse, Koolis. . . ." The old man looked up and saw a roustabout on the high-wire platform playing at stepping out on the wire. The man stumbled, but quickly caught the post behind the platform. Koolis stood and cupped his hands around his mouth.

"Break your neck, fool, and you pay your own furneral."

Koolis turned to see Hamid hobbling off on his crutches. "Hurry, Koolis; assemble the company. Hurry!"

Master Sergeant Levec scanned the indicators and adjusted a control with a feather touch. As the huge machine chewed through the blue-green sulphide vein, an extra drop of oil fell into the crushers dispersing a slight foam accumulation. "You got to keep your eye on that, Balis. Too much foam can really gum up the works."

"I apologize, Sergeant." Balis's hand left the control and reached for the purse beneath his lavender-and-white juggler's robe.

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"Get back on that control!" Levec shook his head as the juggler's hand sped back to the steering buttons. "Look, Balis, I thought we had a deal; you don't pay me every time you make a mistake. Just don't make it again."

"Yes, Sergeant. I got confused."

Levec caressed the cab frame he was using for support and patted it. "You'll get the hang of it. In another two weeks, the Montagnes will be back up in the satellites and you boys will be operating the pit."

Balis scanned the controls, indicators and progress track. "We are on the straight, Sergeant."

"Good. You can put it on automatic."

Balis flipped a switch, leaned back in his seat and sighed. "It seems so much to learn in two weeks."

"A little more involved than tossing around a few balls, eh Balis?" The juggler smiled, reached into his robe and produced four red spheres. Levec took them, sighed, and moved to the back of the cab for the additional headroom. A look of determination on his face, the sergeant made sure of his footing, fixed his eyes on the imaginary high point of the trajectory and began pitching the balls. His hands moved with a steady rhythm keeping no less than two balls in the air at once.

"Now, Sergeant, one hand!" Levec threw three complete cycles one-handed before he broke rhythm, dropping the balls. Balis laughed. "You'll get the hang of it."

Levec gathered up the balls and handed them to Balis. "Here."

"Keep them, Sergeant. I brought them for you."

Levec nodded. "Only to pay for your apologies, of course."

"Of course." Balis smiled. "I will miss you when the Montagnes return to the satellites."

Levec opened his utility bag and put the balls in it. Standing again, he nodded at the juggler. "Well, the Montagne must follow its orders." Levec slapped Balis on the shoulder. "But this does not mean we shall never see each other again. A detail will be down every few weeks to do maintenance."

"Still . . ."

"It's been awhile. You better check the indicators." Levec turned and looked through the dusty sideport at the pit. A kilometer across and eight hundred meters deep at its lowest point, the pit resembled a great, stepped bowl. On each step a line of huge processors, connected by water, slurry, and power ducts, chewed their way around the bowl, widening it and producing

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copper, silver, iron, and arsenic for the satellite defense rings and orbiting bases of the military mission.

A movement in the pit caught his eye, and Levec reached to the console in front of Balis and slammed an orange panel. Power to the processors stopped. "Sergeant, what is it?"

"Something in the pit. Call it in." As Balis radioed pit control, Levec undogged the side door and stepped out on the catwalk. Far to his right, an enormous green animal was leaping down the steps of the pit. In a matter of seconds, it reached the bottom and began swimming the evil-smelling slurry pond. "Balis! Come out here and bring the monocular." As Balis came through the door, Levec took the monocular and focused on the animal in the pond. "Lookit that! Balis, I swear you can have my stripes if I've ever seen anything like that!"

Balis squinted against the sun. "It is one of the great lizards of Arcadia, Sergeant. I've never seen one out here on the desert so close to Kuumic."

"It's pulling something." Levec played the monocular back along the path the lizard had taken. "It looks like a cable or a rope. Look, at the top of the rim."

Balis took the monocular and focused on the rim. A crowd was gathered, watching the lizard. The other end of the rope appeared to be anchored to a high pole on the edge of the rim. Balis turned. On the opposite edge of the pit, another crowd was gathered. The lizard, having traversed the slurry pond, leaped up the steps to the left, still dragging the rope. As the animal disappeared over the opposite rim, the slack in the rope was taken up. Levec took the monocular and saw the rope being anchored to another high post. A figure climbed the post and stood on top, waving to the crowd. From where he stood, Levec could hear the cheers. The figure was handed a long, white pole. Balancing the pole across the rope, the figure began walking out over the pit. In moments the figure had only air between a swaying, narrow path and certain death. Levec switched to a higher powered lens and saw that the figure was a man; an old man. "Balis, who is that?"

"Sergeant, that is Great Tara of the high-wire Riettas. He is enough to make one's heart stop."

"He's so old." Balis watched Levec move and shift as the Montagne Sergeant walked the rope vicariously with the Great Tara. As he reached the center of the rope, the wind across the pit picked up and snatched at the old man's yellow robe. Levec held his breath as the old man sat down on the rope and leaned his

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pole into the wind. The wind gone, the old man did a backwards somersault on the rope, coming up to his feet again. He teetered for an instant, then resumed his walk above the pit. Lifetimes later, the Great Tara stood atop the anchor pole on the other side of the pit. At both ends of the rope a cheer went up, accompanied by signs, each one a letter, spelling **HAMID'S GREATER SHOWS—TARZAK.** Then the crowd was gone. Levec looked at Balis, confused. "They were all with that circus."

"Yes."

"But between Montagnes and trainees, there can't be more than twenty people here in the pit."

"True, Sergeant, but I heard that Tara put on a spectacle yesterday at the microwave relay station by climbing one of the guy wires supporting the broadcast antenna. There were only eight soldiers at the station."

Levec shook his head. "I don't know much about advertising, Balis, but it seems they're going about it the wrong way. Soldiers aren't even allowed planetside." Levec played the monocular along the rope, watching it sway in the wind. "But I sure wish I could see that show."

Balis smiled, entered the cab and pulled some flyers from his robe. In seconds he had them stuffed into Levec's utility bag.

Captain Bostany knew the perspiration running down her back was imaginery, but as she stood at strict attention before General Kahn, while he traced little circles on his command desk with a wicked-looking swagger stick, she swore her boots were filled to overflowing.

Kahn dropped the stick on his desk with a clatter, folded his hands and pursed his lips. "Let's try it one more time, Captain, shall we?"

"I . . . I await the general's pleasure."

Kahn pressed a panel on his desk causing the bulkhead behind him to part, disclosing an activated holographic command reader. "You know what this is I suppose?"

"Yessir."

Kahn smiled. "That will save some time. Captain, as you can see, the Ninth Quadrant Federation has enough hardware in orbit around Momus to destroy utterly any kind of force the Tenth Federation cares to send against us," the General held up a finger, "if, I repeat, if everything is functioning smoothly. With me?"

"Yessir."

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Kahn picked up a sheaf of papers from his desk. "These are summary courts' records, Captain. As mission sociological officer, you will be interested to know that the Momus military mission has the worst petty disciplinary rate in the sector."

"Yessir."

"Captain, that includes the Quadrant bases around all three penal colonies!"

"Yessir."

"Captain, the men and women manning this mission are Montagnes, the most professionally disciplined soldiers in the Quadrant forces. This cannot go on. First, I want you to tell me why, then I want to know what you are going to do about it."

"Yessir. The positive soc—"

"So help me, Captain, if you start talking sociological parameters, biofeed responses, or negative poop loops again, I will eat your head off!"

"Well, General, it's a combination of things—that caused the disciplinary problems, that is. The analysis just completed. . . ."

"Skip that and get to what it is."

". . . ah, yessir. Well, sir, to be overly simplistic about it . . ."

"Impossible."

". . .yessir. Well, sir, it's what we call acute environmental awareness."

"That's what you call it; what would I call it?"

"Cabin fever?"

"Go on."

"Well, sir, it's just that the isolation from the planet's surface is beginning to have neg— ah, well, sir, it's beginning to get to the troops."

"Now, Captain, we are at a point we could have reached an hour ago. Cabin fever, huh?"

"Yessir."

"I can think of maybe twenty military missions offhand that are similarly isolated for political reasons, environmental conditions, any number of reasons." The General waved the stack of papers. "None of them has this problem."

"Yessir, I mean, nossir. Everyone brought up on charges so far has undergone analysis to determine the soc— uh, to see if there is a common cause. Using that information, my department conducted additional surveys and found that the pattern extends to dependent families and civilian employees."

"And?"

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"Well, sir, it's probably a lot more complicated than it sounds. Doctor Graver, the chief of psych, says that it's probably symobolic for—"

"What is it, Captain?"

"Sir, uh . . . the personnel, they . . . want to go and see the circus."

"Circus."

"Yessir."

Kahn studied an empty spot in the air until Captain Bostany had to break the silence or run screaming from the compartment. "Sir, we traced the information about the circus to the crews operating the relay station, the open-pit mine operations. . . "

"Momus doesn't even have a circus."

Bostany reached into a folder and placed some papers in front of the General. "We obtained these from the crews rotating from planetside."

Kahn studied the flyers and shook his head. "Captain, would you tell me why men, women, and children who have at their disposal a variety of the most sophisticated recreational facilities known to modern science, want to go see a circus?"

"Yessir," Bostany smiled and pulled a bound set of papers from her folder. "I'm writing a paper on it."

"Just *why*, Captain."

"Yessir. Outside of actual sports activities, virtually all of our recreations are remote sensory. There is an unreality about them that leaves unfulfilled certain needs."

"Unreality? Captain, have you ever used a fantasizer? You can climb the Matterhorn if you want, and even be frostbitten."

"Yessir. But, before and after the experience, you know that the experience never was and that no challenge existed. Doctor Graver agrees with me that this phenomenon is actually a reach for reality."

Kahn held up a flyer depicting a huge lizard in pink tights and tassels, holding a small, turban-wrapped boy high over its head with one hand. "You call this reality?"

"That's what it seems to represent to the personnel."

Kahn looked at the flyer and nodded. "I guess it is, for Momus." He looked up. "Your recommendation?"

"General, we have to let mission personnel get in some time planetside on a regular basis to see the circus, go backpacking, or just walk around and breathe fresh air."

"You have another plan? Allenby would kill that one in a

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second, and you know why."

"No other plan that is practical. Either get them planetside or replace the entire complement. We ran the sociological progressions, and visiting planetside on a rotating basis would have no adverse impact. The impact Lord Allenby fears happens only if the mission uses planetside bases."

"Your department checked out the fortune teller's story, then?"

"Yessir; and her accuracy is uncanny, except for this. Her recommendation was complete separation. It's strange that she could be so accurate with one and miss so badly on the other. But, she's hardly a computer."

Kahn snorted out a short laugh. "Tayla the fortune teller has Allenby's ear; your computer doesn't." Kahn reached for the communicator built into his desk. "Get me Ambassador Humphries." He turned back to Bostany. "Put together the best case you can, Captain. You are about to meet the cashiered former Ambassador and present Statesman of Momus, Great Allenby, magician and newsteller." Kahn shrugged. "Part of that reality we're reaching for, I imagine."

While Captain Bostany explained her sociological progression tables, charts and diagrams, Allenby looked at the people seated on cushions around his table. Ambassador Humphries, as usual, scowled impatiently. Seated next to the Ambassador, General Kahn remained properly impassive. Across from Allenby, Hamid of the Miira riders looked at the center of the table, seeing nothing. Next to Hamid, Tayla the fortune teller watched Bostany's performance through hooded eyes. Bostany collected her papers and concluded: "Therefore, Lord Allenby, while the complete separation protects Momus from undesirable socio-impact, it is having an undesirable impact on the military mission. As I have repeated, my department has determined that there will be no adverse impacts as a result of limited interaction between—"

"No!" Tayla held up her hands, palms toward Allenby. "I have seen what will be and what can be, Great Allenby. I say that the soldiers must stay in the sky."

Allenby shrugged. "Then, Ambassador Humphries, that is my answer. The mission personnel remain off planet."

"Lord Allenby; be reasonable, man. Captain Bostany is more than qualified to determine whether or not there will be problems from limited contact. She has the command of the latest computerized investigation tools. Against this, you would take the word

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of a spiritualist?"

"Humphries, from birth Tayla has been trained to absorb information, associate it, weigh probabilities, and project outcomes given a certain set of circumstances. There is nothing spiritual about it. She couldn't tell you how she arrives at a particular conclusion, but I can tell you the conclusions are accurate. I think the general can support what I say."

Kahn nodded. "I saw Tayla observe our original occupation and defense plan of Momus, then point by point list the sociological results. This has since been verified by Captain Bostany—that is, except the need for complete separation, as I think she has shown."

Allenby nodded at Bostany. "Captain, I do not doubt your qualifications. However, a skilled fortune teller can do anything your computers can do, and a lot faster. In addition, Tayla knows Momus. There must be a factor, some seemingly unimportant fact, you failed to include. Mission personnel will not come planetside."

"Great Allenby." He turned to see Hamid looking at him through hazy blue eyes. The old rider's face was tired as death. "Great Allenby, I beg you. If the soldiers do not come down, the circus will die. We have been open now for only three nights, and already the tiers at the Great Ring are half-filled. The main attractions cannot continue without the soldiers."

"You have heard Tayla speak. Can I sacrifice the way of an entire planet's life for the sake of a few attractions?"

"I would ask Great Tayla a question." Hamid turned to the fortune teller. "Great Tayla, how is it that a few soldiers visiting my circus will destroy us when the ancestors of Momus, the old circus, traveled among worlds of strangers for many centuries?"

Tayla closed her eyes. "I see what I see."

Allenby stood. "Then, if there is nothing else?"

Hamid pulled himself along on his crutches until he stood in the light coming from the Great Ring. Still outside the spectators' entrance, he could not bring himself to enter. Moving to the side to stand alone in the dark, the old man listened to the music coming from within. He watched the pitifully few customers walking up and down the midway, peeking into the stalls and tents, reading the signs and listening to the barkers. The side attractions were falling off as well. But, thought Hamid, it is nothing to them. When the circus dies, they will play the squares and fires as before. But for us . . . He stood back in the entrance and for a

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moment watched Tessia and her parents high above the sawdust. He turned away. For us there will be no tomorrow. As a cheer erupted from the Ring, Hamid lifted his eyes to see a fortune teller's stall. Inside, a lone woman in the blue robe sat playing solitaire, unmindful of the noise and music. Hamid thought, shook his head, and thought again. It was so simple. Smacking his head, he hobbled off in the darkness.

"Great Tayla." Hamid nodded his head.

The old fortune teller squinted at him from her place at her table, then nodded. "Enter, Hamid. Be seated." The old man hobbled into the dark room, propped his crutches against the wall and lowered himself to the single cushion before Tayla's table. On the table, a single oil lamp illuminated the room. "What brings you?"

"It is your greatness that brings me."

She read the old man's eyes, disliking what she saw there. "Be clear, old rider."

Hamid nodded. "The captain fortune teller of the soldiers does not understand. I did not either."

"Understand?"

"Great Allenby spoke truly when he said you could do anything the captain's machines could do, and at greater speed." Hamid grinned. "But, our Statesman did not honor you enough."

"Get on with what you have come to say, Hamid."

"Great Tayla, you can do something the captain's machines cannot."

"Which is?"

"You can lie."

Tayla's face froze. "I told what I saw. All those soldiers and others here on Momus, they would absorb us. We, our way of life, would cease to be. It is the truth!"

Hamid nodded. "As much of it as is told. But the bases, all those soldiers, live up in the orbiting bases and stations. Our way of life is safe from them."

"No!" Tayla shook her head. "They must stay there; We can be safe only if they stay off Momus—all of them."

Hamid rubbed his chin. "Tayla, what did you see of the circus, if the soldiers only visited? You saw the circus born again, didn't you?"

Tayla closed her eyes. "I am tired, Hamid. Leave me."

"You saw it born again."

"Yes!" Tayla flinched at the loudness of her own voice. "Yes,

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but that only among other things . . ."

"You saw riders, high-wire walkers, flyers, great beast and jungle acts standing where they have not been for many years; center ring, main attractions . . ."

"Hamid, there is more."

"Yes, you saw more, Tayla. You saw fortune tellers tucked away in a little stall off the midway—sideshows, reading palms and leaves, telling the rubes what they would like to hear."

The old woman's eyes brimmed with tears. "Old man, Allenby will listen only to what I say."

"What if I took this to your daughter Salina? She is respected. What would her visions be? What if I took this to all the great fortune tellers on Momus? Allenby will not believe the captain, but would he believe ten, fifty, or a hundred fortune tellers?"

"They will see the same things I saw."

The old man shrugged. "Perhaps not. They are younger; perhaps they will be able to see beyond a vision of a sideshow."

Tayla laughed. "What can you tell me about what they would see, old rider?"

"I think they would see that fortune telling has changed since the days Momus was first settled. Riders, flyers, trainers, are the same as we were. But fortune telling has changed. It has grown. Great men and women of business come and sit before your table to hear the future and make their plans. You have outgrown the circus. I think they will see that."

The old woman frowned, then reached beneath her table and withdrew a clear glass sphere. She placed it on the table and adjusted the oil lamp. She sat for only a moment, staring deep within the glass, then closed her eyes and nodded. "I did not look beyond that vision. Understand my loyalty to the fortune tellers, Hamid. I saw this, and—"

"And lied!" Hamid gripped the edge of the table and pushed himself to his feet. He took his crutches, placed them under his arms and turned toward Tayla. "You will tell Allenby?"

Tayla looked into the old man's angry face. "Yes, I will tell him." Hamid hobbled toward the door. "Hamid?"

He turned to face her. "Yes?"

"I am ashamed. But tonight in Great Allenby's quarters, I saw an old cripple prepared to destroy an entire people, just to put his son on a horse. Is my shame any greater than his?"

Hamid looked at the old woman, then bowed his head. "No, Great Tayla. You see better into my own heart than I do."

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"It is my trade."

Hamid looked at her and smiled. "Do I owe you for this visit?"

The old woman smiled and shook her head. "No Hamid; I think we are even. Must you go?"

Hamid laughed. "Yes. I must see a man about a horse."

Allenby bid Koolis, Master of the Ring, goodbye and turned his attention to the tiers packed with Montagne soldiers, civilians and, best of all, hordes of excited, wide-eyed children. The Ring stood brightly in the glow of eight searchlights General Kahn supplied to replace the rows of oil lamps, while from the bandstand, the musicians delivered a lusty march in preparation for the Great Parade. Disus, Allenby's chief-of-staff, walked up and stood beside him next to the Ring. "A marvelous spectacle, is it not?"

Allenby nodded. "The man behind this, however, is the real marvel. Koolis told me that Hamid began this without a movill in his purse; yet look at the acts he has assembled and the audience he has attracted."

Disus shrugged and waved an idle hand at the soldiers. "If Hamid cannot go to the Montagne . . ."

"Don't finish that if you value your life. See to our seats." Grinning, Disus bowed and went off to negotiate for seating space.

Opposite the entrance, high on the last tier, an old man leaned on a crutch and surveyed the amphitheater. Before the night's show, Koolis had stood before him shaking his head. "Every last percentage of the gate has been exchanged for acts, food, materials, and supplies. I keep the accounts, Hamid. No matter the success; you will not find youself a movill richer."

"I have my reward, Koolis," he had said.

The Master of the Ring shrugged and shook his head. "A high price to pay for sentiment, my friend."

"It is not sentiment."

"What then is your reward? I do not understand." Koolis left, shaking his head and fondling his fat purse.

As the Great Parade began, the old man leaned forward to see four brothers in silver-spangled tights mounted on four gleaming white stallions enter the Ring at the head of the parade. Four brothers—whose sons and daughters will ride, and all their sons and daughters after them.

"Yes, Koolis," the old man whispered, "my fortune *is* made."

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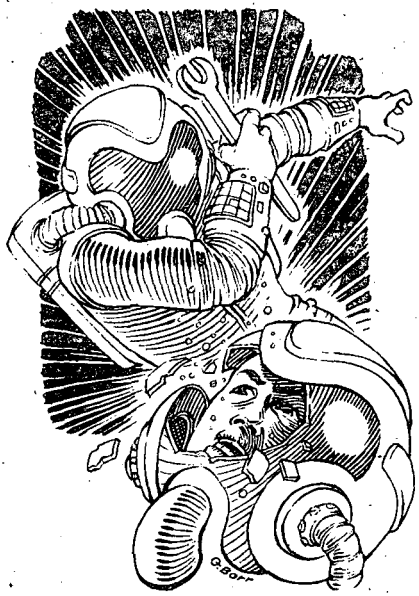
FIT THE CRIME

by Noah Ward

art: George Barr



This, one of the longer entries in our horrid-pun contest, appears (as well it should) under a pseudonym. Mr. Ward is a professional in the science fiction field whose work has appeared in these pages before.

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Berns waited for it. He knew it was coming. It came.

"Hmmm," Isennao said, fake-musing. "Scratching your ned, Head?—sorry, I mean, scratching your head, Ned?"

"As you see," Berns said, stopping. A little itch, he could have ignored it, but now . . . He looked past Isennao's cropped haircut. The dome's viewport did not reflect the interior lighting, and he was able to see the stars, like bright dust. Some of the light that now struck through the viewport and across the Earth-normal atmosphere of the dome molded to the asteroid had been traveling for millions of years; if he kept his mind on that, perhaps he could pass the coming trial. . . .

"It may seem unsympathetic, Ned," Isennao said with the slightly crooked smile Berns had come to dread, "but I have to tell you, it gladdens my heart to see you scratching there."

Berns sighed. If he stayed mute, refused Isennao's gambit, he would be taking a step toward withdrawal, toward the self-isolation that led to what was still called "cabin fever"—the madness that grew between two men cooped up together for months; if he accepted it, the result would be almost more than he could bear. But the Survey Manual was firm on that point: under all circumstances, *relate*; pulling back was more of a no-no than even the most violent confrontation.

"Why is that, Ikei?"

"Oh—" Isennao's smile broadened. "—it's a site for psoriasis."

Berns looked at him blankly for a moment. "What has that . . . oh. *Oh.*" He drew a long breath between clenched teeth. He wondered why Isennao was not drawing back from him in fear; surely, from the way he felt, his face must be dangerously purple, his eyes bulging, and that big vein in his temple visibly pulsating . . . . Probably the blood of Ikei's samurai ancestors had imbued him with the stoic code of *bushido,* forbidding him to show fear even in the face of the greatest peril. But there ought to be something in *bushido* against making god-awful puns, especially in this setting—two lone humans on a frozen rockball, with the immensity and glory of the Galaxy stretching away in every direction!

Berns drew his lips down over his teeth and willed his muscles to draw the left side of his mouth, then the right, upwards. He made himself say, with a ghastly mimicry of cordiality, "Hey, that's a real *ai! ai!*, isn't it?" *Relate.* Relate? To a clown who not only was addicted to inflicting cruel and unusual puns—damn! It was infecting *him,* now!—but who had even coined that arch

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name for the worst examples out of his own initials? Listen, Manual, Berns thought, are you sure about that? A little cabin fever might be the *best* way to get through the last two months here. Would it be so bad, slinking silently around, looking at each other out of the corners of their eyes, always conscious of the nearest tool that might be used for a weapon . . . ? It could beat having to listen to Isennao cheapen the Universe with his word-play.

"Say, thanks," Ikei said. He took a sip of his after-dinner "cordial"—a synthesist's miracle that reproduced precisely the taste, aroma and bite of a good brandy with absolutely none of the deleterious side effects, such as enjoyment—and went on: "I worked up a good one, my last shift outside. I won't ask you if you've heard it, because you couldn't've, but it seems there was this white dwarf, and a red giant, and a black hole . . ."

As he listened to his companion deliver the staggeringly indecent punch line—silly as well as dirty, Berns thought; pulsars and quasars couldn't do *that*—he closed his eyes against the vista of the stars. Isennao's loathsome joke seemed to have coated them with slime.

Would it be *relating,* he wondered, if I reached over, grabbed his ears and slammed his face on the table over and over again —*bam,* then *crunch,* then *squish* . . . ?

He held the picture wistfully for a few seconds, then pushed his chair back from the table and stood. "I think I'll suit up, step outside," he said.

Isennao looked at him. "How come? You aren't on shift 'til morning." The blocky asteroid—Isennao had insisted, Burns could not gather why, on christening it Prudential—had no perceptible rotation, but of necessity they used standard time in setting out the work shifts and meals.

"It's such a nice goddamn *night* I thought I'd take a goddamn *walk*!" Berns said, and stormed into the suiting chamber.

Out on the airless surface, he became calmer. It *was* a nice night, if you wanted to look at it like that . . . eternal and infinite night. The jagged horizon fell away from him on all sides, so that he seemed almost to be on a mountaintop, the rich ocean of stars surrounding him, clots of light here, a thinner powdering there; with no distorting atmosphere to mask them, they seemed to fill every square centimeter of his view. An apparent dark space as big as his thumb filled with motes of brightness as his eyes

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adjusted to the absence of the dome lighting. *There* was infinity, written across the heavens, a statement of the incomprehensible grandeur of existence, the challenge that drew men to sail the seas of space on the ultimate adventure . . . .

And he was sharing that adventure with a clod who could think of nothing better to do than contrive excruciating puns and dreadful jokes.

With some difficulty, he lowered his suited form to a protruding rock, and sat and brooded. It had all seemed to make sense, months before, when the Survey picked him and Ikei for the job.

"You two complement each other," Colonel Clark had said. "People too much alike, they'd get on each other's nerves in six months. But this setup, you'll have a resident comic to cheer you up and Isennao'll always have a straight man."

"You couldn't consider sending a gay one?" Isennao had said.

Berns grimaced as he remembered that he had actually *laughed* at the coarse quip.

A patch of stars gleamed at him, reflected in a patch of ammonia ice, reminding him of why they were there. How it was that Prudential had retained, or acquired, the frozen lakes that covered so much of its surface, had completely baffled the Survey's scientists. If the asteroid were the remnant of a planetary breakup, most of its original atmosphere should have vanished millions of years ago. If it hadn't, why not? Or if it had drawn the substance to itself in its wanderings through space . . . that called for investigation, too. Hence his and Isennao's six-month tour of duty and "daily" schedule of analysis and testing.

Berns did not flatter himself that he was capable of interpreting either the function of the tests or their results; he and Ikei were well-trained technicians carrying out instructions and compiling the data, and others would have the work, and the glory, of making any discoveries. But the Earthbound scientists who would sift and interpret what they brought back would have missed the real glory, that of being out here, alone with the sea of light. Maybe, if anything came of this, there'd be a fragment of Prudential, a piece of the rock, on display in the giant Museum of Man in Chillicothe, and on the placard underneath it, some brief mention of Ned Berns and Ikei Isennao . . . .

And if there ever were, Ikei would ruin it utterly with some crass joke. Berns grimaced, then looked up again at the stars and slowly nodded. All right, there was just no point in letting the

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mess drag on. He hated the idea of confronting Isennao, but it was either that or go crazy.

Isennao, still seated, looked up as Berns strode into the dome's living quarters, stood over him and slammed his open hand onto the table. "Ikei . . ."

"That a vote to table the motion?"

"Ikei!"

"Not one of my best, OK . . . ."

"Maybe not," Berns said grimly, "but it's your last."

"Say what?"

Isennao listened thoughtfully to Berns's explanation that his, Isennao's, puns were *a*) an abomination against the solemnity of their location and the gravity of their mission as the cutting edge of human knowledge on the frontiers of space, and *b*) were driving him, Berns, buggy.

"I kind of thought you enjoyed them, in your own square way," Isennao said mournfully. "I had no idea you were constantly doing slow burns, Ned—sorry!" He held up a hand as Berns glared and made a half-step toward him.

"So all right," Isennao said. "You think I'm spitting all over your damn stars. Well . . . maybe I am, come to think of it. You may think it's just great to be way the hell out here and commune with the Infinite, but I can tell you sometimes it scares me silly. I feel all the time as if this hunk of rock could melt out from under me, or I could just drift off it, or some big old space whale that nobody's come across yet could come by and gollup me up. I mean, out here, Earth's *nothing*, and we're less than nothing. When I look up, it looks like I could touch a million stars bigger than Sol, and you better believe it doesn't make *me* feel exalted. So, yeah, I make my jokes and puns—they're mine, they come out of me, they're my own personal atmosphere I carry around with me, and they by God keep me alive and sane! I appreciate how you feel, Ned, but I don't think you've got enough of an argument to convince me."

"If you make one more pun," Berns said slowly, "I will kill you."

"Now *that's* an argument. But you wouldn't . . ." Isennao looked up at Berns's set face. "Let me put that another way: you would, wouldn't you?"

Berns nodded.

"I see your point. But what the hell do you expect me to do to

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keep going?"

"Find a hobby."

"Bird watching, maybe?" Isennao said scornfully. "That's the . . . huh. Say, I used to be pretty good at . . . Yeah."

"What, uh, are you figuring on doing?" Berns said. Reaction to the unaccustomed display of rage had left him weak in the knees and anxious to return to some sort of civilized footing with his companion, to get back to what the Manual demanded: relating.

Isennao smiled. "It'll be a surprise. But I think it'll keep me busy enough so I won't be tempted to upset you—and risk my neck—with any more *ai! ai!*s."

With the strain of bearing with Isennao's puns and jokes lifted, Berns found life tranquil and pleasant in a way he hardly remembered. He took a fresh interest in the work, and sensed, to his surprise, a touch of regret that it was to be over in a few weeks. It seemed to him that he could stay on here, adrift among the stars, forever. In their off hours the two men were relaxed and mildly cordial, as though, having survived the brief emotional storm, they owed each other a wary consideration.

He was slightly disappointed that Ikei was so secretive about his hobby, but he was content to wait for the promised surprise. The only clues he had to it were a fresh hole in the nearest deposit of ammonia ice, indicating the removal of about a third of a cubic meter, and Ikei's request for a supply of spare gold leaf kept on hand for the spectroscopy equipment; he felt no compulsion to follow these hints up, and made a point of avoiding the outside storage shed where Ikei was working.

Ten days after Berns's ultimatum, Ikei's voice crackled in his suit radio. "You just about finished for the day, Ned?"

"Just D-One to check, then I'm through."

"Come on round to the shed then, when you're done, OK? Got something to show you."

Berns stopped short as he entered the shed. It glittered like crystal in the glare of the worklight, a soaring shape—not a dove, not an eagle, but, it seemed to him, the very essence of flight, carved with breathtaking skill from a block of ice. It was surrounded with a lacy, elongated umbrella of fire, as though a golden rocket—or a sun—had exploded at some point above it and sent down its fragments trailing glory. He stepped closer and saw that it was a half-ovoid of transparent plastic to which the design had been applied in gold leaf.

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"My grandpa taught me woodcarving when I was a kid," Ikei said, "and this was pretty much the same thing. Hell working on it with gloves on, though, but if I took it inside, the little bugger'd 've been a smelly puddle in seconds. You like it?"

Berns nodded slowly, feeling ashamed. How could he have dismissed Ikei as a vulgar jester . . . and vaunted himself on his own sensitive response to the majesty of space and the glory of man's venture into it? Never could he have created, never even conceived, such a heartbreakingly beautiful statement of it—the carven figure emblematic of all aspiring and seeking life, the golden rain a perfect representation of the riches of the nonliving universe within which life moved . . . .

"It's . . . I don't know what to say, Ikei," he said huskily.

He looked at Isennao, searching for words that would come near to expressing the awe he felt. Through Isennao's faceplate he could see that slightly crooked smile of pleasure that had been absent these ten days; then he saw the lips move briefly, as if murmuring two short syllables, though no sound came through his headphones.

A smile? *Two* unvoiced syllables? God almighty, was Ikei saying . . . ?

Berns turned again to the magnificent sculpture into which Isennao had poured the essence of his philosophy and vision, his ultimate creation.

Then he gave a hoarse yell of anguished fury, and reached for a heavy wrench that lay on the workbench.

"It's not *regular,* Charley, it's, you know, *messy*?" the Curatorial Assistant (Clerical) said into the phone. On the visiscreen in front of him he watched the ceremony taking place upstairs in the Great Hall.

"This triumph of the human spirit," Colonel Clark was telling the crowd of dignitaries, "comes to us out of the void—not only the void of space, but a void of mystery. For we do not know even which of those two brave, tragically fated men wrought it. It only remains for us to do them, and ourselves, the honor of installing it in this great Museum of Man . . . ."

"The way you do it is, you acquire the thing, you enter it in the inventory, and *then* you put the sucker on display, you see?"

". . . to be preserved here in an environment duplicating that in which it was created—a vacuum chamber at near-absolute zero that is in essence an enclave of outer space . . ."

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"Well, Charley, I would like at *least* to get it entered before the speeches get done with and it's officially on display, that would make me feel some better. And to do that, I got to know what it *is*, if that's no problem to you."

"We may ask ourselves what happened on that frozen ball of rock so far away. Did a design flaw in Isennao's faceplate cause it to implode with sudden, fatal results? Did Berns, in despair and loneliness, open his own helmet to the eternal night . . . ?"

"That's a *title*, not a description, Charley. I mean, you could call *anything* 'Aspiration,' and if it turned up missing, how would you describe it to the cops? Would it be *too* much trouble to tell me what the damn thing *is* and what it's made of? OK, thanks."

"We may ask ourselves such questions, but we can never know the answers. If the story is a darker one—a possibility we cannot scout, for the deeps of space do strange things to those who dare them—we shall never know the motive behind it . . . ."

The clerk gave a sigh of relief as he typed the final line on the inventory card:

Ammonia bird, in gilded cage.

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I certify that the statements made by me above are correct and complete.

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Vice President and Treasurer

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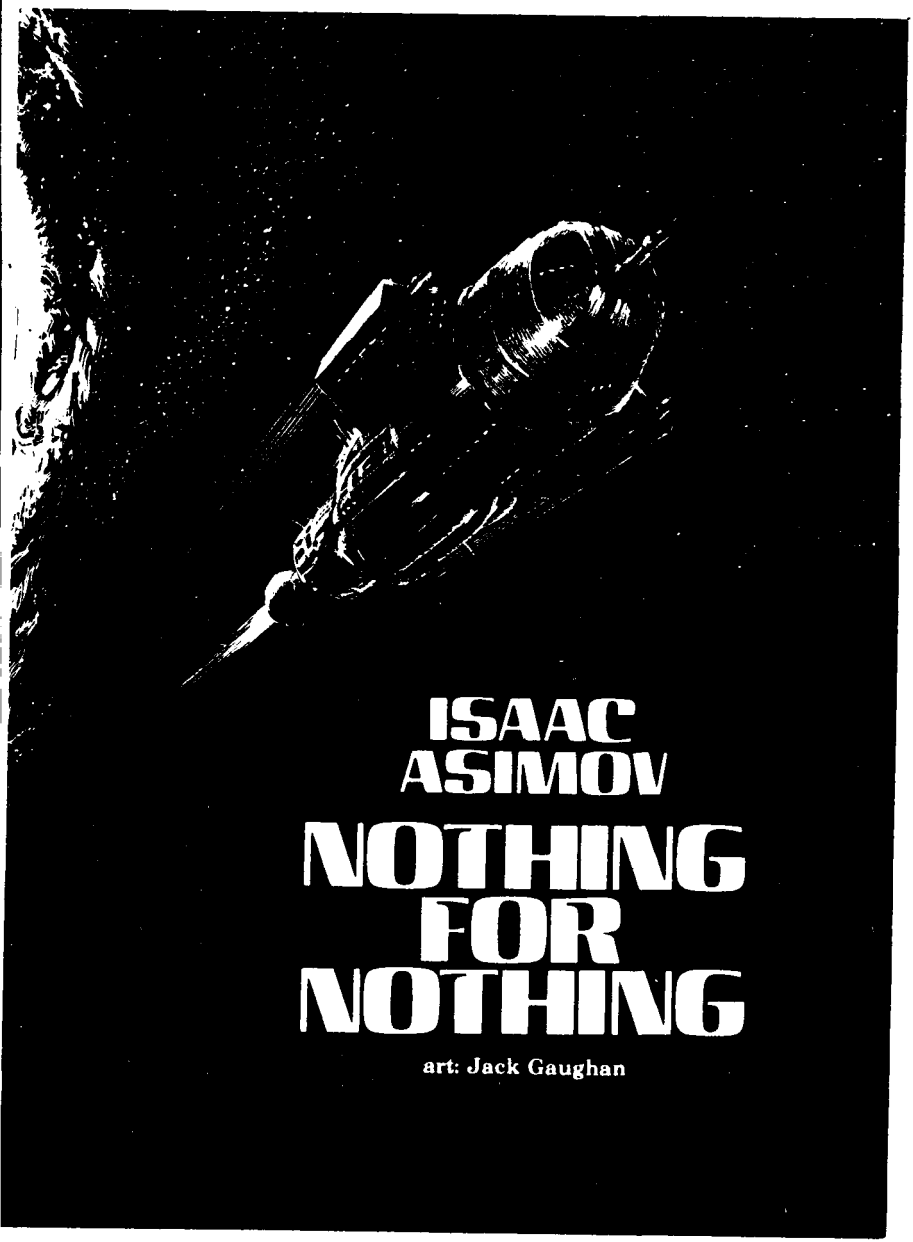

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Dr. Asimov is currently at work on his autobiography, which is turning out to be a two-volume work of remarkable size and interest.

The scene was Earth.

Not that the beings on the Starship thought of it as Earth. To them it was a series of symbols stored in a computer; it was the third planet of a star located at a certain position with respect to the line connecting their home planet with the black hole that marked the Galaxy's center, and moving at a certain velocity with reference to it.

The time was 15,000 B.C., more or less.

Not that the beings on the Starship thought of it as 15,000 B.C. To them, it was a certain period of time marked off according to their local system.

The Captain of the Starship said, rather petulantly, "This is a waste of time. The planet is largely frozen. Let us leave."

But the Ship's Explorer quietly said, "No, Captain," and that was that.

As long as a Starship was in space, or in hyperspace for that matter, the Captain was supreme; but place that ship in orbit about a planet and the Explorer could not be challenged. He knew worlds! That was his specialty.

And this Explorer was in an impregnable position. He had what amounted to a sure instinct for profitable trade. It had been he and he alone who was responsible for the fact that this particular Starship had won three Awards for Excellence for the work done in the three last expeditions. Three for three.

So when the Explorer said, "No," the Captain could not dream of "Yes." In the unlikely case that he would have dreamed of it, the crew would have mutinied. An Award for Excellence might be, to the captain, a pleasant spectral disk to suspend in the main salon; but to the crew it meant a spectacular addition to take-home pay and an even more welcome addition to vacation time and pension benefits. And this Explorer had brought them that three times. Three for three.

The Explorer said, "No strange world should be left unexamined."

The Captain said, "What is strange about this one?"

"The preliminary probe shows intelligence, and on a frozen world."

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"Surely that's not unprecedented."

"The pattern here is strange." The Explorer looked uneasy. "I am not sure exactly how or exactly why, but the pattern of life and of intelligence is strange. We must examine it more carefully."

And that was that, of course. There were at least half a trillion planetary worlds in the Galaxy, if one only counted those associated with stars. Add to that the indefinite number moving independently through space and the number might be ten times as great.

Even with computers to help, no Starship could know them all; but an experienced Explorer, by dint of lacking interest in anything else, of studying every exploratory report published, of considering endless correlations, and—presumably—playing with statistics even in his sleep, grew to have what seemed to others a mystical intuition about such things.

"We'll have to send out probes in full interlocking program," said the Explorer.

The Captain looked outraged. Full power meant a leisurely examination for weeks at enormous expense.

He said, and it was as much as he could offer in the way of objection, "Is that absolutely necessary?"

"I rather think so," said the Explorer with the diffidence of one who knows his whim is law.

The probes brought back exactly what the Captain expected, and in great detail. An intelligent species rather reminiscent, at least as far as superficial appearance went, of the lesser breeds of the inner proximal regions of the fifth arm of the Galaxy—not quite unusual, but of interest to mentologists, no doubt.

As yet the intelligent species was only at the first level of technology—long, long removed from anything useful.

The Captain said so, scarcely able to mask his exasperation; but the Explorer, leafing through the reports, remained unmoved. He said, "Strange!" and asked that the Trader be summoned.

This was really too much. A successful Captain must never give a good Explorer cause for unhappiness but there are limits to everything.

The Captain said, fighting to keep the level of communication polite, if not friendly, "To what end, Explorer? What can we expect at this level?"

"They have tools," said the Explorer thoughtfully.

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"Stone! Bone! Wood! Or this planet's equivalent of that. And that's all. Surely we can find nothing in that."

"And yet there is something strange in the pattern."

"May I know what that might be, Explorer?"

"If I knew what it might be, Captain, it would not be strange, and I would not have to find out. Really, Captain, I must insist on the Trader."

The Trader was as indignant as the Captain was, and had more scope to express it. His, after all, was a specialty as deep as that of anyone's on the Starship; even, in his own opinion (and in some others') as deep and as essential as the Explorer's.

The Captain might navigate a Starship and the Explorer might detect useful civilizations by the most tenuous of signs; but in the final clutch, it was the Trader and his team who faced the aliens and who plucked out of their minds and culture that which was useful and gave in return something *they* found useful.

And this was done at great risk. The alien ecology must not be disrupted. Alien intelligences must not be harmed, not even to save one's own life. There were good reasons for that on the cosmic scale and Traders were amply rewarded for the risks they ran, but why run *useless* risks.

The Trader said, "There is nothing there. *My* interpretation of the probe's data is that we're dealing with semi-intelligent animals. Their usefulness is nil. Their danger is great. We know how to deal with truly intelligent aliens, and Trader teams are rarely killed by them. Who knows how these animals will react—and you know we are not allowed to defend ourselves properly."

The Explorer said, "These animals, if they are no more than that, have interestingly adapted themselves to the ice. There are subtle variations in the pattern here I do not understand, but my considered opinion is that they will not be dangerous and that they may even be useful. I feel they are worth closer examination."

"What can be gained from a Stone Age intelligence?" asked the Trader.

"That is for you to find out."

The Trader thought grimly: Of course, that is what it comes to—for *us* to find out.

He knew well the history and purpose of the Starship Expeditions. There had been a time, a million years before, when there had been no Traders, Explorers, or Captains but only ancestral

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animals with developing mind and a Stone Age technology—much like the animals on the world they were now orbiting. How slow the advance, how painfully slow the self-generated progress—until the third-level civilization had been reached. Then had come the Starships and the chance of cross-fertilization of cultures. *Then* had come progress.

The Trader said, "With respect, Explorer. I grant your intuitional experience. Will you grant my practical experience, though it is less dramatic? There is no way in which anything below a third-level civilization can have anything we can use."

"That," said the Explorer, "is a generalization that may or may not be true."

"With respect, Explorer. It *is* true. And even if those—those semi-animals had something we could use, and I can't imagine what it might be, what can we give them in exchange?"

The Explorer was silent.

The Trader went on. "At this level, there is no way in which a proto-intelligence can accept an alien stimulation. The mentologists are agreed on that and it is my experience, too. Progress *must* be self-generated until at least the second-level is reached. And we *must* make a return; we can take nothing for nothing."

The Captain said, "And that makes sense, of course. By stimulating these intelligences to advance, we can harvest them again at a later visit."

"I don't care about the reason for it," said the Trader, impatiently. "It is part of the tradition of my profession. We do no harm under any conditions and we give in return for what we take. Here there is nothing we will want to take; and even if we find something, there will be nothing that we can give in return. —We waste time."

The Explorer shook his head. "I ask you to visit some center of population, Trader. I will abide by your decision when you return."

And that was that, too.

For two days the small Trader module flashed over the surface of the planet searching for any evidence of a reasonable level of technology. There was none.

A complete search could take years but was scarcely worth it. It was unreasonable to suppose a high level would be hidden. The highest technology was always flaunted for it had no enemy. That was the universal experience of Traders everywhere.

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It was a beautiful planet, half-frozen as it was. White and blue and green. Wild and rough and variegated. Crude and untouched.

But it was not the Trader's job to deal with beauty and he shrugged off such thoughts impatiently. When his crew talked to him in such terms, he was short with them.

He said, "We'll land here. It seems to be a good-sized concentration of the intelligences. We can do no better.

His Second said, "What can we do with even these, Maestro?"

"You can record," said the Trader. "Record the animals, both unintelligent and supposedly intelligent, and any artifacts of theirs we can find. Make sure the records are thoroughly holographic."

"We can already see—" began the Second.

"*We* can already see," said the Trader, "but we must have a record to convince our Explorer out of his dreams or we'll remain here forever."

"He is a good Explorer," said one of the crew.

"He has been a good Explorer," said the Trader, "but does that mean he will be good forever? His very successes have made him accept himself at too high an evaluation, perhaps. So we must convince him of reality—if we can."

They wore their suits when they emerged from the module.

The planetary atmosphere would support them; but the feeling of exposure to the raw winds of an open planet would discommode them, even if the atmosphere and temperature were perfect—which they weren't. The gravity was a touch high, as was the light level; but they could bear it.

The intelligent beings, dressed rather sketchily in the outer portions of other animals, retreated reluctantly at their approach and watched at a distance. The Trader was relieved at this. Any sign of non-belligerence was welcome to those who were not permitted to defend themselves.

The Trader and his crew did not try to communicate directly or to make friendly gestures. Who knew what gesture might be considered friendly by an alien? The Trader set up a mental field, instead, and saturated it with the vibrations of harmlessness and peace and hoped that the mental fields of the creatures were sufficiently advanced to respond.

Perhaps they were, for a few crept back and watched motionlessly as though intensely curious. The Trader thought he detected fugitive thoughts—but that seemed unlikely for first-level beings and he did not follow them up.

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Instead, he went stolidly about the business of making holographic reproductions of the vegetation, of a herd of blundering herbivores that appeared and then, deciding the surroundings were dangerous, thundered away. A large animal stood its ground for a while, exposing white weapons in a cavity at its fore-end—then left.

The Trader's crew worked similarly, moving methodically across the landscape.

The call, directly mental, and surcharged with such emotion of surprise and awe that the informational content was all but blurred out, came unexpectedly.

"Maestro! Here! Come quickly!"

Specific directions were not given. The Trader had to follow the beam, which led into a crevice bounded by two rocky outcroppings.

Other members of the crew were converging but the Trader had arrived first.

"What is it?" asked the Trader.

His Second was standing in the glow of his suit-radiation in a deeply hollowed-out portion of the hillside.

The Trader looked about, "This is a natural hollow, not a technological product."

"Yes, but look!"

The Trader looked up and for perhaps five seconds he was lost. Then he sent out a strenuous message for all others to stay away.

He said, "Is this of technological origin?"

"Yes, Maestro. You can see it is only partly completed."

"But by whom?"

"By those creatures out there. The intelligent ones. I found one at work in here. This is his light source; it was burning vegetation. These are his tools."

"And where is he?"

"He fled."

"Did you actually see him?"

"I recorded him."

The Trader pondered. Then he looked up again. "Have you ever seen anything like this?"

"No, Maestro."

"Or heard of anything like this?"

"No, Maestro."

"Astonishing!"

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The Trader showed no signs of wanting to withdraw his eyes, and the Second said, softly, "Maestro. What do we do?"

"Eh?"

"This will surely win our ship still a fourth Prize."

"Surely," said the Trader, regretfully, "if we could take it."

The Second said, hesitantly, "I have already recorded it."

"Eh? What is the use of that? We have nothing to give in exchange."

"But we have this of theirs. Give them *anything* in exchange."

The Trader said, "What are you *saying?* They are too primitive to accept anything we could give them. It will surely be nearly a million years before they could possibly accept suggestions of exogenous origin. —We will have to destroy the recording."

"But we *know*, Maestro."

"Then we must never talk about it. Our craft has its ethics and its traditions. You know that. Nothing for nothing!"

"Even this?"

"Even this."

The Trader's sternly implacable set of expression was tinged with unbearable sorrow and despite his "Even this" he stood irresolute.

The Second sensed that. He said, "*Try* giving them something, Maestro."

"Of what use would that be?"

"Of what harm?"

The Trader said, "I have prepared a presentation for the entire Starship, but I must show it to you first, Explorer—with deep respect and with apologies for masked thoughts. You were right. There *was* something strange about this planet. Though the intelligences on the planet were barely first level and though their technology was primitive in the extreme, they had developed a concept we have never had and one that, to my knowledge, we have never encountered on any other world."

The Captain said, uneasily, "I cannot imagine what it might be." He was quite aware that Traders sometimes overpraised their purchases to magnify their own worth.

The Explorer said nothing. He was the more uneasy of the two.

The Trader said, "It is a form of visual art."

"Playing with color?" asked the Captain.

"And shape—but to most startling effect." He had arranged the holographic projector. "Observe!"

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In the viewing space before them, a herd of animals appeared: bulky, shaggy, two-horned, four-legged. They hesitated, then ran, dust spurting up beneath their hooves.

"Ugly objects," muttered the Captain.

The holographic recording brought the herd to a halt, clamped it down to a still. It magnified; and a single beast filled the view, its bulky head lowered, its nostrils distended.

"Observe this animal," said the Trader, "and now observe this artificial composition of a primitive concoction of oil and colored mineral, which we found smeared over the roof of a cave."

There it was again! Not quite the animal as holographed—flat, but vibrant.

"What a peculiar similarity," said the Captain.

"Not peculiar," said the Trader. "Deliberate! There were dozens of such figures in different poses—of different animals. The likenesses were too detailed to be fortuitous. Imagine the boldness of the conception—to place colors in pleasing shapes and combinations, and in such a way as to deceive the eye into thinking it is looking at a real object. These organisms have devised an art that represents reality. It is representational art, as I suppose we might call it.

"And that's not all. We found it done in three dimensions also." The Trader produced an array of small figures in grey stone and in faintly-yellow bone. "These are clearly intended to represent themselves."

The Captain seemed stupefied. "Did you see these manufactured?"

"No, that I did not, Captain. One of my men saw a planetary being smearing color on one of the cave representations, but these we found already formed. Still, no other explanation is possible than that they were deliberately shaped. These objects could not have assumed these shapes by chance processes."

The Captain said, "These are curious, but one doesn't follow the motive. Would not holographic techniques serve the purpose better—at such times as these are developed, of course?"

"These primitives have no conception that holography could someday be developed and could not wait the million years required. Then, too, maybe holography is *not* better. If you compare the representations with the originals you will notice that the representations are simplified and distorted in subtle ways designed to bring certain characteristics into focus. I believe this form of art *improves* on the original in some ways and certainly

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has something different to say."

The Trader turned to the Explorer. "I stand in awe at your abilities. Can you explain how you sensed the uniqueness of this intelligence?"

The Explorer signed a negative. "I did not suspect this at all. It is interesting and I see its worth—although I wonder if we could ourselves properly control our colors and shapes in order to force them into such representational form. Yet this does not match the unease within me. —What I wonder is how you came into possession of these? What did you give in exchange? It is *there* I see the strangeness lie."

"Well," said the Trader, "in a way you're right. Quite strange. I did not think I could give anything since the organisms are so primitive, but this discovery seemed too important to sacrifice without some effort. I therefore chose from among the group of beings who formed these objects one whose mental field seemed somewhat more intense than that of the others and attempted to transfer to him a gift in exchange."

"And succeeded. Of course," said the Explorer.

"Yes, I succeeded," said the Trader happily, failing to notice that the Explorer had made a statement and had not asked a question. "The beings," the Trader went on, "kill such animals as they represent in color, by throwing long sticks tipped with sharpened stone. These penetrate the hides of the animal, wound and weaken them. They can then be killed by the beings who are individually smaller and weaker than the animal they hunt. I pointed out that a smaller, stone-tipped stick could be hurled forward with greater force and effect and with longer range if a cord under tension were used as the mechanism of propulsion."

The Explorer said, "Such devices have been encountered among primitive intelligences which were, however, far advanced beyond these. Paleomentalists call it a bow-and-arrow."

The Captain said, "How could the knowledge be absorbed? It couldn't be, at this level of development."

"But it *was*. Unmistakeably. The response of the mental field was one of insight at almost unbearable intensity. —Surely you do not think I would have taken these art objects, were they twenty times as valuable, if I had not been convinced that I had made a return? Nothing for nothing, Captain."

The Explorer said in a low, despondent voice, "There is the strangeness. To accept."

The Captain said, "But surely, Trader, we cannot do this. They

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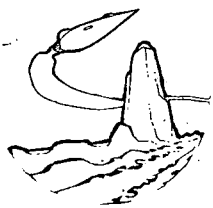
are not ready. We are harming them. They will use the bow-and-arrow to wound each other and not the beasts alone."

The Trader said, "*We* do not harm them and we *did* not harm them. What *they* do to each other and where they end as a result, a million years from now, is their concern."

The Captain and the Trader left to set up the demonstration for the Starship's company, and the Explorer said sadly in the direction in which they had gone: "But they accepted. And they flourish amid the ice. And in twenty thousand years, it will be *our* concern."

He knew they would not believe him, and he despaired.



ZUGG'S FALL
by Frederick Longbeard

Zugg the Informer eyed the sensors through sweat-soaked brows. The blackhanders were almost on him. He had sold his information honestly, but the blackhanders sought revenge. As Zugg made landfall over England, he knew he couldn't remain aloft. Aligning his ship with the River Tyne, Zugg threw on the airbrakes and went down.

As the ship hit the water, its sea anchors failed to extend, skipping the craft along the water. Ahead a bridge loomed, and Zugg slammed the overcontrol, lifting the ship momentarily from the surface, over the bridge, only to smash into a cathedral, bringing its towers and bells down in a cloud of dust.

The next morning, Zugg read in the local newspaper, "**A Snitch In Tyne Staves Shrine.**"

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OUTSIDE
by Keith Davis

Keith Davis is thirty-one, married three years, and has a daughter seventeen months old. Born in Ohio, he now lives in Spokane, WA, where his hobbies are reading, pipe smoking, coaching youth sports, and being outdoors. This story is his first sale.

I went Outside for the first time tonight. I was a little afraid at first. I've never been Outside before. I've been in the back yard a lot, but that's not the same thing. It's a big yard with lots of trees, shrubs, and gardens. We have a big high stone wall that goes all around the yard. I've often wondered what it's like Outside, but the wall is too high for me to climb.

My older brother has been Outside lots of times. He told me all about it and what it was like, but I was still a little scared.

Mommy helped me get dressed. I was dressed like my brother. Mommy said it was the easiest thing. It was just a pair of pants and a shirt. Then she drew some lines on my face with a black pencil.

I soon forgot to be afraid when I got caught up in the excitement. There were all those other kids running around dressed up in different costumes. Some of them were pretty good. I felt bad that we didn't have good ones like them. There were ghosts, skeletons, vampires, monsters, and so many others that I can't remember them all. Some of them were pretty scary looking, but I knew they were really just pretend.

But the most fun of all was the candy! All I had to do was knock on the door and yell, "Trick or Treat." Then the door would open and someone would dump goodies into my sack. Some of the people were dressed-up scary, but I knew that was only pretend, too.

Daddy said I couldn't eat anything until I got back home and he looked it all over. He said there's some crazy people in the world who like to hurt little kids by putting poison or sharp things in candy. I don't think that's very nice. They must be bad people.

We walked all over the neighborhood. I saw so many things. I got tired, but I didn't want to quit.

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When we finally got back home, Daddy dumped all my candy on the table and looked through it. Most of it was okay. He only threw a few things away and said something about being on the safe side.

I wanted to eat everything right away, but Mommy just laughed and said I should eat a little now and save the rest so it would last several days.

Mommy and Daddy let me stay up awhile to eat my candy. Then they told me to get ready for bed. It was a lot later than I usually got to stay up anyway.

I'm lying here in bed now, trying to go to sleep. But I'm too excited thinking about how much fun I had tonight. When Mommy and Daddy came to tuck me in, I asked them why can't I go Outside more often. They said I'm not old enough and they don't want me to get hurt. I wonder what's Outside that would hurt me. I didn't see anything tonight. I asked when I would get to go Outside again. They looked at each other and Daddy said maybe next year. A year sounds like an awfully long time. I can't imagine how long it is. But I have lots of toys and things to play with.

Mommy and Daddy just left. Mommy kissed me and tucked me in. Daddy made sure my tail was underneath the covers so it wouldn't get cold. Then he kissed me, too; and patted me on the head between my horns. He said he hoped I had a good time.

I can't wait until next year!

REBUTTAL TO REBUTTAL TO $TAR WAR$

In making an empire quite free
It surprises some people to see
  A cute princess all perk
  Make the men do the work,
But it isn't surprising to me.

—Shaw Vinist

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A BAIT OF DREAMS

by Jo Clayton

art: Karl Kofoed

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Born 39 years ago—one of those rarities, a genuine, native-born Californian—Miss Clayton grew up on a dairy farm in the gentle wilds outside Modesto. She looks back on those days with warm nostalgia and a firm determination never to attempt to earn her living at farming. She graduated from the University of Southern California (ΦBK), and now teaches English in an inner-city school in New Orleans, struggling to interest seventh-graders in the basics of writing. She writes in part to remind herself that the English language does indeed exist. While this is her first short story, she has had four novels accepted by DAW Books, Diadem from the Stars, Lamarchos, Irsud, *and* Maeve.

As Gleia hurried along the uneven planks of the walkway, pattering around the bodies of sleeping drunks, slipping past workmen and market women, Horli's red rim bathed the street in blood-red light, painting a film of charm over the facades of the sagging buildings.

She glanced up repeatedly, fearing to see the blue light of the second sun Hesh creeping into the sky. Late. Her breath came raggedly as she tried to move faster. She knocked against people in the crowded street, drawing curses after her.

Late. Nothing had gone right this morning. When Horli's light had crept throught the holes in her torn shade and touched her face, one look at the clock sent her into a panic, kicking the covers frantically aside, tearing her nightgown over her head. No time to eat. No time to discipline her wild hair. She dragged a comb through the worst of the tangles as she splashed water into a basin. No time to straighten the mess in the room. She slapped water on her face, gasping at the icy sting.

Rush. Grab up the rent money. Snatch open the wardrobe door and pull out the first cafta that came to hand. Slip feet into sandals. A strap breaks. With half-swallowed gasp, dig out the old sandals with soles worn to a paper thinness. Rush. Drop the key chain around her neck. Hip strikes against a chair, knocking it

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over. Ah! No time to pick it up. Plunge from the room, pausing only to make sure the lock catches. Even in her feverish hurry she could feel nausea at the thought of old Miggela's fat greasy fingers prodding through her things again.

Clatter down the stairs. Down the creaking groaning spiral, fourth floor to ground floor. Nod the obligatory greeting to the blunt-snouted landlady who came out from her nest where she sat in ambush day and night.

The sharp salty breeze whipped through the dingy side street, surrounding her with its burden of fish, tar, exotic spices, and the sour stench from the scavenger's piles of scrap and garbage. The smells slid by unnoticed as she ran down the wooden walk, her footsteps playing a nervous tattoo on the planks. As she turned onto the larger main street, she glanced up once again. Hesh still hadn't joined Horli in the sky. Thank god. Still a little time left. She could get to the shop before Hesh-rise.

Her foot came down hard on a round object. It rolled backward, throwing her. She staggered. Her arms flung wildly out, then she fell forward on the planks, feeling her palms tearing as she tried to break her fall, feeling her knees tearing even through the coarse cloth of her cafta.

For a minute she stayed on hands and knees, ignoring the curious eyes of the workers flowing past her. Several stopped and asked if she was hurt. But she shook her head, her dark brown hair hanging about her face, hiding it from them. They shrugged, then went on, leaving her to recover by herself.

Still on her knees, she straightened her body and examined her palms. The skin was broken and abraded. Already she could feel her hands stiffening. She brushed the grit off, wincing at the pain. Then she looked around to find the thing that had brought her down. A crystalline pebble was caught in one of the cracks between the planks. Shaped like an egg, it was just big enough to fit in the palm of her hand. "A Ranga eye," she whispered.

Blue Hesh slid over the edge of the roof above her, reflecting in the crystal. Gleia looked cautiously around, then thrust the eye into her pocket and jumped to her feet, wincing at the pain that stabbed up from her battered knees. Limping, she hurried on toward the center of the city.

"You're late." Habbibah came fluttering through the lines of bent backs, her tiny hands thrusting out of the sleeves of her elegant black velvet cafta like small pale animals. Her dark eyes darted from side to side, scanning the girls' work as she moved.

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Gleia sucked in a deep breath, then lowered her head submissively. She knew better than to try to excuse herself.

Habbibah stopped in front of her, moving her hands constantly over herself, patting her hair, stroking her throat, touching her mouth with small feathery pats. "Well?"

Gleia stretched out her hands, showing the lacerated palms. "I fell."

Habbibah shuddered. "Go wash." She flicked a hand at the wall clock. "You'll make up the time by working through the lunch break."

Gleia bit her lip. She could feel the emptiness growing inside her and a buzzing in her head and a tremble in her knees. She wanted to protest but didn't dare.

"Go. Go. Go." Habbibah fluttered hands at her. "Don't touch the wedding cafta with those filthy hands and don't waste more time."

As Gleia went into the dark, noisome washroom, she heard the soft voice lashing first one then another. She made a face and muttered, "Bitch." The falling curtain muted the poisonous tongue.

Hastily Gleia scrubbed at her hands, ignoring the sting of the coarse soap. She dried them on the towel, the only clean thing in the room. Clean because a filthy towel might lead to filthy hands which could damage the fine materials the girls worked on. Not for the workers, nothing ever done for the workers. She felt the crystal bang against her thigh as she turned to move out, felt a brief flare of excitement, but there was no time and she forgot it immediately.

She slid into her place and took up her work, settling the candles so the light fell more strongly on the embroidery. White on white, a delicate pattern of fantasy flowers and birds.

Habbibah's shadow fell over the work. "Hands."

Gleia held out her hands. Small thumbs pressed hard on the drying wounds.

"Good. No blood." Habbibah's hand flew to the shimmering white material protected from dust and wear by a sheath of coarse unbleached muslin. "Slow." A finger jabbed at the incomplete sections, flicking over the pricked-out design. "I must have it done by tomorrow. A two-drach fine for each hour you take over that." Her shadow moved off as she darted away to scold one of the girls who was letting her candle gutter.

Gleia caught her breath, a hard frustration squeezing her in the

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middle. Tomorrow? Sinking her teeth in her lower lip, she blinked back tears. She'd been counting on the money Habbibah had promised her for this work. Twenty-five oboli. Enough to finish off the sum she needed to buy her bond, even to pay the bribes and leave a little over to live on. Now. . . . She looked around the cavernous room with the fifty small lights flickering over bent heads. Then she gritted her teeth. Damn her, she thought. I'll finish this on time if it kills me.

Resolutely she banished all distraction and bent over the work, her stiffened fingers slowing her until the exercise warmed them to their usual suppleness.

As the band of embroidery crept along the front panels of the cafta, Gleia felt hungry, her stomach paining almost as if she were poisoned, but that went away after a while.

While she sewed, her mind began to drift though her eyes clung tenaciously to the design. In a painful reverie, she relived brief images from her life, tracking the thread of events that had led her to this place at this moment. . . .

First memories. Pain and fear. Dim images of adult faces. A woman's arms clinging to her, then falling away. A man, face blurred, unrecognizable, shouting angrily, then in pain, then not at all. Then a series of faces that came and went like beads falling from a cheap necklace.

Then . . . digging in garbage piles outside kitchen doors, fighting the scavengers—small shaggy creatures, with filthy hands and furtive eyes—for scraps of half-rotten vegetables, or bones with a shred of meat left on them.

Habbibah came back, jerked the work from her hands and examined it closely. "Sloppy," she grunted. She held the work so long Gleia clenched her hands into fists, biting her lip till blood came to hold back the protest that would spoil all her chances of finishing the cafta on time.

A smile curled Habbibah's small tight mouth into a wrinkled curve, then Habbibah thrust the material back at her. "Take more care, bonder, or I'll have you rip the whole out."

Gleia watched her move on. For a minute she couldn't unclench her fingers. She wants me to go overtime. She wants to make me beg. Damn her . . . damn her . . . damn . . .

After a minute she took up the work again, driving the needle

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through the fabric with a vicious energy that abated after a while as the soothing spell of the work took over. Once again she fell into the swift loose rhythm that freed her mind to think of other things.

Begging in the streets, running with packs of other abandoned children, sleeping in abandoned houses or old empty warehouses, barely escaping with her life from a fire that took twenty other children, wandering the streets, driven by cold back into the houses where the only heat was the body heat of the children sleeping in piles where some on the outside froze and some on the inside smothered, children dying in terrible numbers in the winter, only the toughest surviving.

Being beaten and hurt until she grew old enough to fight, learning to leap immediately into all-out attack whenever she had to fight, no matter what the cause, until the bigger children let her alone since it wasn't worth expending so much of their own meager energy to defeat her over small matters.

Being casually raped by a drunken sailor, then forgotten immediately as he staggered away, leaving her bloody and crying furiously on the cobblestones, not wholly sure of what had happened to her, but recognizing the violation of her person and vowing it would not happen again, screaming she would kill him kill him. . . .

Running in a gang after that, being forced to submit to Abbrah, the leader, bully-stupid but too strong for her, taking a perverse pride in being chosen, never liking it, realizing about that time the vulnerability of male pride and the superiority of male muscle.

Learning to steal, driven to stealing by Abbrah, stealing from a merchant, being caught, branded, bound into service with Habbibah.

Being scrubbed up and forced to learn . . . the lessons, oh the lessons, shadowed impersonal faces bending over her, voices, hushed and insistent, beating at her. . . .

She jumped. A cowled figure moved soundlessly past, the coarse cloth of his robe slapping against her ankles. She watched the Madarman halt beside Habbibah and begin talking. Habbibah nodded and the two figures moved out of the room, both silent, both trailing huge black shadows that spread depressingly over the sewing girls. What's that about, she wondered. Madarman . . .

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. . . cowled figures, voices demanding, learn or be beaten, memorize and repeat, mechanical rote learning, paying no attention to what is learned, cram the songs, the histories, the Madarhymns into the unwilling little heads. Repeat. Repeat. Work all morning, then, when her body rebelled, when she yearned for the freedom of the streets with a passion that swamped even her continual hunger to know, set to school by order of the Madarmen to save her pitiful soul.

History in chant. Jaydugar, the testing ground of the gods. The Madar's white hands reached among the stars and plucked their fruit, the souls that needed testing, catmen and mermen, caravanner and hunter, scavenger and parsi, plucked wriggling from their home trees and dropped naked on the testing ground. Chant of the coming. I take you from the nest that makes you weak and blind. I take from you your metal slaves. I take from you your far-seeing eyes. I take from you the wings whereby you sail from star to star. I purify you. I give you your hands. I promise you cleverness and time. Out of nothing you will build new wings. . . .

New wings. Gleia snorted. Several girls turned to look at her, their faces disapproving. She smiled blankly at them and they settled back to work. She could hear the furtive whispers hissing between them but ignored them. Her needle whispered through sheer white material, popping in and out with smooth skill. She sniffed scornfully at the other girls' refusal to accept her into their community.

New wings. . . . She frowned down as she looped the thread in a six-petalled flower and whipped the loops in place. It might make an interesting design . . . new wings . . . the stars . . . she popped the needle through the material in a series of dandelion-bloom crosses. Did we all come here from other stars? How? Her frown deepened. The Madar . . . that was nonsense . . . wasn't it?

The Madarman came down the aisle and stopped beside her. He held out his hand. Reluctantly Gleia set the needle into the material and gave him her work, biting her lip as she saw the dark crescents of dirt under his fingernails. She held her breath as he brought the cloth up close to rheumy eyes.

"Good," he grunted. He thrust the cloth back at her and stumped off to rejoin Habbibah. Gleia took a minute to stretch her cramped limbs and straighten her legs as she watched Habbibah usher him out. Looks like I'm up for a new commission, she thought. She looked over the line of bent backs, feeling a fierce

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superiority to those giggling idiots raised secure in homes with fathers and mothers to protect them. Here they were anyway, doing the same thing for a lot less pay than she was getting. Gleia. The despised bonder. The marked thief. She wriggled her fingers to work some of the cramp out of them, then touched the brand on her cheek. Then she sighed and went back to the design. Her thoughts drifted back to her life. Remembering. . . .

Being forced to learn rough sewing, then embroidery, taking a timid pride in a growing skill, taking a growing pride in making designs that she soon recognized to be superior to any others created in Habbibah's establishment.

Learning she could buy herself free of the bond if she could ever find or save enough money. Fifty oboloi for the bond. Fifty oboloi for the bribes. More to keep herself while she hunted for work. Joy and despair. And joy again. . . .

Demanding and getting special pay for special projects. Her work brought fancy sums to Habbibah's greedy fingers and more—a reputation for the unique that brought her custom she couldn't have touched before. The old bitch tried to beat her into working, but she had learned too well how to survive. She was stubborn enough to resist punishment and to persist in her demands, sitting resolutely idle through starvings and whippings and threats until she won her point.

Gleia jabbed the needle through the cloth. It glanced off a fingernail, coming close to pricking her finger and drawing blood. She leaned back, breathing fast, trying to calm herself. A drop of blood marring the white was all she needed. Not now. Not so close to winning. She couldn't stand another month of this slavery. She fingered the mark on her cheek and knew they'd throw her into prison as incorrigible if she tried to run away.

Sometime later Habbibah made the last round, inspecting the day's work. She stopped beside Gleia and picked up the cloth, running the unworked length of design through her plump white fingers. "Pah! too slow. And there." She jabbed a forefinger at the last sections of work. "You did finer work than that when you were learning. Tomorrow you come in one hour early. Abbosine will be told to let you in." She pinched the material between her fingers. "Take out that last work to there." She thrust the strip of embroidery into Gleia's face and indicated a spot about two palms' width above the last stitches. "I won't tolerate such miserable

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cobbling going out under my name."

Gleia closed her eyes. Her hands clenched into fists. She wanted to smash the old woman in the face, to smash smash smash that little weasel face into bloody ruin, then wipe the ruin on that damn cafta. But she doubted whether she could stand without tumbling over, so she managed to keep her head down and her mouth shut. When the old woman went off to scold someone else, she sat still, hands fisted in her lap.

Habbibah's scolding voice faded as she left the room. The other girls moved about, chattering cautiously, eyes turning slyly about, watching out for the sudden return of their employer. When they had all trickled out, bunched into laughing clusters of work-friends, Gleia forced herself onto her feet.

The world swung. She grabbed at the sewing stand and held on tight until the room steadied around her. With neat economical movements she folded her work and put it in the box, then she walked through the rows of silent tables, a fragile glass person that the slightest shock would crack into a thousand fragments.

Outside, the darkening twilight threw a veil of red over the crowded streets, blurring covered carts with screeching wheels into horsemen riding past in dark ~~solid~~ groups into single riders gawking at the city sights into throngs of people pushing along the wooden walkways. She hummed the Madarchant of the peoples. *Chilkaman catman fisherman and hunter, parsi plainsman desert fox and herder, firssi mountainman caravanner hawkster. . . .* In spite of her fatigue she sucked in a deep breath and watched furtively the fascinating variety of peoples flowing past her. Chilka catmen from the plains with their hairy faces, flat noses, and double eyelids, the inner transparent one retracted into the damp tissue folds around their bulging slit-pupilled eyes. Caravanners, small and quick, more like her own parsi people, dark hair, dark eyes, pale faces. Mountain hunters, far from their heights, with dark gold skin and brown hair bleached almost white at the tips, leading horses loaded with fur bales.

A breath of salt air, cool and fresh as the sea itself, stung her nose. A flash of opaline emerald. Impression of scaled flesh flowing liquidly past. A merman. Ignoring the irritated protest of the other pedestrians she turned and stared after the slim amphibian walking with the characteristic quick clumsy grace of the sea folk. She didn't recognize him. Disappointed, she edged to the wall and stumbled tiredly though the crowd thinking about the only

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friend she'd ever had, a slim green boy . . . so long ago . . . so long ago. . . .

She walked slowly into the dingy front hall of the boarding house, putting each foot down with stiff care, wondering how she was going to get up all those damn creaking stairs.

"Gleia, 'spina." The hoarse breathy voice brought her to a careful halt. She inched her head around, feeling that her burning eyes would roll from her head if she moved too quickly.

"Rent." Miggela held out a short stubby hand.

Gleia closed her eyes and fumbled in her pocket, sore fingers groping for the packet of coins she'd put there earlier. Her fingers closed on the egg-shaped stone and she frowned—not remembering, for a minute, where the thing came from.

The rat-faced landlady scowled and flapped her pudgy hand up and down. "Rent!"

Gleia slid her hand past the crystal and found the packet. Silently she drew it out and handed it to the old woman.

Miggela tore clumsily at the paper. Her crusted tongue clamped between crooked yellow teeth, she counted the coins with deliberate slowness, examining each one with suspicious care, peering nearsightedly at the stamping.

Gleia rubbed her hand across her face, too tired to be irritated.

Slipping the coins into a sleeve pocket, Miggela stood staring up into the taller woman's drawn face. "You're late. You missed supper."

"Oh."

"And don't you go trying to cook in your room."

"No." She wasn't hungry anymore but knew she had to have food. Her legs trembled. She wanted more than anything to lie down. But she turned and went out. She walked slowly over the uneven planks, heading aimlessly toward the edge of the night-quarter and a familiar cookshop.

Gleia strolled out of the cookshop feeling more like herself with two meat pies and a cup of cha warming her middle. She held a third pie in her hand. She sank her teeth into the pie, chewing slowly, drifting along the street watching the people move past her.

Horli was completely gone in the west with only a stain of red to mark her passing while the biggest moon Aab was thrusting her pale white edge over the rooflines to the east, her brilliant colorless light cutting through inky shadows. Gleia knew she

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should get back to her room. There were too many dangers for a woman alone here. Sighing, she began working her way through the noisy crowd toward the slum quarter. She finished the pie, wiped her greasy hands on a bit of paper, and dropped the paper in the gutter for the scavengers to pick up in their dawn sweeps through the streets.

The crowd thinned as she left the commercial area and moved into the slum that held a few decrepit stables and row on row of ancient dwellings converted into boarding houses. Some were empty with staring black windows where the glass was gone—stolen or broken by derelicts who could find no other place to sleep. One by one these abandoned houses burned down, leaving behind fields of weeds and piles of broken, blackened boards.

Gleia looked up at the grey, weathered front of Miggela's place. She was tired to the point of giddiness but she felt such a reluctance to go inside that she couldn't force her foot onto the warped lower step; instead she went past the house and turned into the alley winding back from the side street. Moving quickly, eyes flicking warily about, she trotted past the one-room hovels where the small scurrying scavengers lived anonymous lives. Sometimes desperate bashers and maulers hid out there waiting for sailors to come stumbling back to their ships. She went around the end of a warehouse, the last in the line of those circling the working front of the dredged port. The water here was too shallow to accommodate any but the smallest ships.

She saw a small neat oceangoer, a chis-makka, one of the independent gypsy ships that went up and down the coast as the winds and their cargoes dictated. The ship was dark, the crew apparently on liberty in one of the taverns whose lights and noise enlivened the waterfront some distance in toward the center. Out here it was quiet, with ravellings of fog beginning to thicken over the water. As the waves slapped regularly at the piles, the evening on-shore breeze made the rigging on board the chis-makka creak and groan.

Gleia edged to the far side of the wharf and kicked off her sandals. Then she ran along the planks, bent over, making no more sound than a shadow. She slid over the end of the wharf and pulled herself onto one of the crossbars nailed from pile to pile under the broad planks. Ignoring the coating of slime and drying seaweed, she sat with her back against a pile, her legs dangling in space, her feet moving back and forth just above the rocking surface of the water.

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For a long while she sat there, the sickening emotional mix settling away until she felt calm and at peace again. The fog continued to thicken, sounds coming to her over the water with an eerie remoteness.

Something pushed against her thigh. She remembered the Ranga eye that had thrown her so disastrously in the morning. As she reached into her pocket, the water broke in a neat splash and a glinting form came out of it, swooping onto the crossbar beside her. In her surprise she nearly toppled off into the still-agitated water, but the merman caught hold of her and steadied her.

Her face almost nosing into his chest, she saw the water pour from his gill slits and the slits squeeze closed. The moonlight struggling through the fog touched his narrow young face and reflected off his pointed mother-of-pearl teeth as he sucked air into his breathing bladder than grinned at her. "Thought it was you. No other land crawler ever come here."

"Tetaki?" She closed her fingers around his cool hard forearm. "I haven't seen you in years." Shaking her head, she smiled uncertainly at him. "Years."

"Not sin' you was finger high."

"You weren't any bigger." She tugged at her nose, amusement bubbling inside her. "Brat."

He perched easily on the narrow bar, his short crisp hair already drying and springing into the curls that used to fascinate her with their tight coils and deep blue color. "Good times. We was good friends." He was silent a minute. "This isn't the firs' year I come back. You never come here."

"I was thinking about you earlier." She pushed away from the pile and touched his knee. "The only friend I ever had."

His hand closed around hers, cool and metal smooth, his flesh unlike hers but comforting. "I come each time. You were never here."

"At first I couldn't," she said, her fatigue and depression coming back like the fog to shroud her, smother her spirit. She sighed. "Later . . . Later, I forgot."

"What happened?" His hand tightened on hers. She looked up. The shining unfamiliar planes of his face seemed to banish the fog. Then he smiled. His teeth were a carnivore's fangs, needle sharp and double rowed. "Forgot me? Shame."

She laughed and pulled free. "I turned thief. Abbrah made me. Remember him?"

His teeth glinted again. "I got reason."

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Gleia stared at her feet swinging back and forth over the dark water, almost black here under the wharf but flickering with tiny silver highlights where the moonlight danced off the tops of wavelets, remembering. . . .

A delegation of the amphibian people had come to negotiate trade rights with the Maleek; Tetaki's father was a minor official. She remembered a slim scaled form with big lightgreen eyes and tight-coiled blue hair poking through a dingy side street looking eagerly about at the strange sights. Alone. Foolishly alone. Abbrah's gang gathered around him, baiting him, coming closer and closer to attack. Something about his refusal to give in to them stirred a spark in Gleia and she fought her way to his side in that stubborn all-out battle the gang knew too well. So they backed off, shouting obscenities, reasserting their dominance by showing contempt for her and her protégé. She took him back to his father and scolded the startled merman for his carelessness.

"You got caught." His dry comment roused her from her reverie.

"I was a lousy thief. Yes, I got caught. And bonded. See?" She turned her face so he could see the bondmark burned into her cheek. "What about you?"

He chuckled and waved a hand toward the dark shadow that marked the presence of the chis-makka. "Ours. This is the fifth summer we come to the fairs."

"Hey." She forced congratulatory laughter.

He bent closer, staring into her face. "You don' look so good."

She yawned. "Madar, I'm tired." She swallowed another yawn. "That's all."

"Come back wit' me. Temokeuu would welcome you. You could live wit' us."

She stroked the mark on her cheek but didn't answer for a minute. He settled back, content to let her announce her answer when she was ready. Finally, she shook her head. "Can't, Tetaki. I'm stuck here till my bond is cancelled. You going to be here long?"

"We've had good trading." He frowned. "Two, three days more, I think."

"At least we can talk some. I've missed having someone to talk to."

"Come see Temokeuu. We show you the ship."

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"Sure." She yawned again. "I'd better get back. I have to be up an hour early tomorrow." She swung herself up onto the wharf, hung her head over the edge for a minute. "See you."

Her room looked like someone had taken a giant spoon and given it a quick stir. The sheet, blanket, and quilt hung over the side of the bed where she'd kicked them. Her one chair was overturned. She remembered her hip catching it on the way out. The wardrobe door hung halfway open. The sandal with a broken strap sat forlornly in the middle of the floor.

Gleia stretched, feeling the spurious energy from the warm food beginning to trickle away. Yawning repeatedly she pulled the bed to rights and straightened the room superficially, then tugged the ties loose and pulled her cafta over her head. The crystal bumped against her and she fished it out before she hung the garment away. Then she strolled across the room to the nightstand, turning the Ranga eye over and over in her hands. She dropped it in the middle of the bed and took out her cha pot, setting it next to the water tin. From the bottom drawer in the bed table she pulled out the tiny sway-bottomed brazier, setting it up on the wide window ledge. Using the candle and strips of paper, she got the charcoal burning, then set the water tin on the grill. Making sure the window was wedged open, she left the tin to boil and went back to the nightstand. She dumped a palmful of leaves into the cha pot and got a cup ready, then let herself collapse on top of the quilt.

She folded the pillow twice to prop up her head and reached out, prodding the quilt. She fished the eye from under the curve of her back and turned it over and over, examining it idly.

A Ranga eye. She'd heard whispers of them. A frisson of fear shivered down her spine. If they caught her with it. . . . If they caught her, she could forget about buying her bond. Or anything else. If I could sell it . . . somehow . . . somehow . . . if I could sell it, Madar! Bonded thief with a Ranga eye. If I could sell it. . . .

The crystal warmed as she touched it. At first a few tentative sparks licked through the water-clear form. She felt a surge of delight. The tips of her fingers moved in slow caressing circles over the smooth surface. The colors began cycling hypnotically, then the color forms began to shift their nature, imperceptibly altering into images of a place. As she watched, the picture developed rapidly, blurred at first, then sharpening into focus.

Gentle hills rolled into a blue distance, covered with a velvety green carpet, a species of thick moss dotted with small star-

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shaped pseudo-flowers. Other flower forms as large as trees were spaced over the slopes, each form existing at the middle of a circular space roughly equal to the extreme limit of its four leaf-stems. The leaves were eight-sided and multiple, marching along wiry black stems curving out from the central stalk at a spot halfway up to the bloom, four black arcs springing out at the same height from the ground. At the top of each plant great brilliant petals rayed out from a black center that gathered in the butter-yellow light of a single sun.

Another sun. She stroked the crystal, dreaming of another place, a better place, feeling a growing excitement. The tin on the fire began to whistle softly. Gleia dropped the eye on the bed, levered herself up, and scuffed across to the brazier. She poured the bubbling water over the cha leaves. While they were steeping, she tilted the rest of the water onto the glowing coals. Head tipped back to avoid the billowing steam, she let the blackened water trickle down the side of the building. Then she knocked out the wedge and pulled the window shut.

With a cup of cha in one hand and the eye in the other, a clean nightgown on her body and the pillow freshly folded for her head, she lay and watched the play of colors in the crystal. The image began to move through the flower trees, as if she was seeing through the eyes of some creature flying just below the petals of the flower tops. Before she had time to get bored with the lovely but monotonous landscape she flew out into the open, skimming along brilliant white sand. Blue waves rolled in with white-caps breaking cleanly, rhythmically. The sky stretched above, a glowing cloudless blue only slightly lighter than the sea. As she hovered in place she saw other creatures come flittering from the flower forest. A delicate-boned male with huge black eyes danced up to her, spiralling in complex pirouettes.

Huge black eyes soft as soot and as shineless. Thin arms and legs. Hands whose long slender fingers, like jointed sticks, were half the length of the forearms. Body short and broad, the shoulders muscled hugely.

From his back sprang wide delicate butterfly wings patterned with brilliant colors in black-outlined splotches. He rode the air in swoops and glides, wheeled in front of her, small mouth stretched in a wide inviting grin, narrow hands beckoning. . . .

The exhaustion of the day caught up with her and she sank into a heavy sleep, the last of the cha spilling on the bed, soaking into the mattress. The crystal rolled out of her loosened fingers.

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When the alarm bell woke her in the morning the cha spot was still damp and the leaves were smeared over her shoulder and back. The crystal had worked along her body and ended up in the hollow between her neck and shoulder. When she picked it up to put it in the drawer, it seemed to cling to her fingers, quivering gently against her skin, shedding a pleasant warmth that slid up her arm and made her feel soft and dreamy. She shut off the alarm and stumbled to the wardrobe still half asleep in the deep red dawn. With the eye clutched in her hand she fumbled for a cafta. After she wriggled into the garmet, she slid the stone into the pocket not noticing what she was doing, tied the ties, and smoothed the material down over her body.

The cavernous sewing room was dark and silent when Gleia walked in. She wound through the close lines of sewing tables and settled in her usual place. She lit the candles and took out her sewing. Holding the delicate material close to the flame, she examined the last bit of embroidery. It was good enough. Damn if she was going to pick it out.

She threaded her needle with the silk. Tongue clamped between her lips, she snipped at the loose ends, dropping small bits of thread haphazardly over the floor, over her cafta, around the table, scattering the pieces of thread with a gleeful abandon.

Sometime later, after the room had filled and the other girls were bent over their work, Habbibah came by, her sharp eyes darting over the scattered ends of thread. Her mouth pursed in satisfaction, she sailed past to pounce on an unfortunate girl who had chanced to look up and stretch at the wrong time.

Gleia swallowed a smile, feeling a warm buoyant satisfaction at fooling the old bitch.

At the end of the long day, she stretched and rubbed her red, tired eyes. She stood motionless beside the sewing table a minute with eyes closed, then she shook out the cafta, ran a quick eye over the lines of embroidery, put the cafta on a hanger, and carried it to Habbibah.

"Finished," she murmured, keeping her head down to hide the triumph that flushed her face.

Habbibah took the cafta and pulled the bands of embroidery close to her eyes as she went over the work, stitch by stitch. When she was finished, she grunted sourly, her small black eyes darting at Gleia, then she sailed off, the cafta a fluttering white banner beside her small black figure. Gleia waited tensely.

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Twenty-five oboloi, she thought. I won't take less. But she knew that she would, that she had to. But Habbibah didn't know that. Oh God, she couldn't know. I've fought her too often and even won a couple of times. She has to think I'll fight her on this. Has to think . . .

Habbibah came back. She stopped in front of Gleia. "Not your best work," she grumbled. Her small plump fingers were closed about a small bag of coins. "Hold out your hand." With painful reluctance she eased the drawstring loose and pulled out an eight sided gold coin. "Pentobol. One." She pressed the coin into Gleia's palm, her fingers sliding off the metal with a lingering caressing motion.

Slowly, releasing the coins like drops of her own blood, Habbibah counted out five pentoboloi into Gleia's outstretched hand. Holding the bag with the remaining coins pressed tightly against her breast, Habbibah looked at Gleia with distaste. "You be on time in the morning. The Maleeka wants a cafta with embroidered sleeves for the name day of her youngest daughter." She hesitated. "You'll be paid the same," she finished sourly.

Gleia bowed her head further, rounding her shoulders. Hai, you old bitch, she thought. No wonder you paid me the whole. My god, the Maleeka. How you must be preening yourself.

She went out into the street and wandered along, feeling tired but elated. She had the money. No more aching back. No more passive acceptance of abuse. She fingered the mark on her cheek. Closed her fingers on the coins in her pocket. The eye rolled against her hand but she ignored it, happily planning her visit to the House of Records.

Her feet eventually took her to the boarding house. Looking up at the shadowed facade she scratched her chin and hesitated. She could smell the awful stew Miggela had cooked up for them, an unappetizing mess with a few shreds of cheap meat, tough vegetables, and thick filling of soggy barley. The rancid smell followed her as she walked away toward the cookshop where the grease was fresher at least. Foolish as it was to wander about with all that money in her pocket, it was good to walk and feel free for a while, to let the sea breeze ruffle through her hair, to sluff along the walkway, winding in and out of the men and women walking purposefully homeward, the noisy influx of sailors from the wharves, the streetwalkers who were coming out to start their peculiar workdays. She looked eagerly around trying to spot

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another of the mermen but saw none.

She came out of the shop munching on a pie, enjoying the taste all the more when she thought of the stew the faceless collection of losers were stuffing down their throats at Miggela's table.

She stopped at the alley leading to the wharf but shook her head. That would be a bit too stupid. Sighing, she clumped up the steps and went inside.

Miggela popped out of ambush. "You missed supper."

Gleia compressed her lips, but swallowed what she wanted to say. Somehow, this close to freedom, it was doubly hard to control her tongue. "Yes," she said.

"You don't get no refund, you miss supper."

"I know." She nodded briefly and moved away to the spiral staircase with its collection of creaks and groans.

In her room, she crossed to the window, leaned out, hid the money in her special place under the eaves. After lighting her candle she tidied the room a bit more and heated water for cha. When she was finally ready for bed, she was surprised to find the eye in her hand. She didn't remember picking it up. For a moment she was frightened, then curious. The crystal warmed in her palm as she walked slowly across to the bed.

Sipping at the cha, the quilt pulled in a triangle over her middle, she held the eye up enjoying the flow of the colors.

Then she was flitting again under the flower tops. She came out on the beach, further on this time. Hovering over the white sand, she looked curiously around and saw distant buildings perched on slender poles, a line of graceful points and curves on the horizon. Then the butterfly man came sailing out of the sun, a black shimmer with gold edges dancing on the breeze, an ebullient joyfulness that made her quiver with delight and feel the swoop of laughter in her blood. She joined him, dancing, turning, twisting over the blue-green of the wrinkled sea. Cool wine air slipped along her body and her dance became more intense. Others came and they laughed a silent laughter, long slender feelers clicking in telegraphic wit.

The mug dropped, spilling a last few drops of cold cha on the bed as she drifted to sleep, fingers still curled tightly about the eye. In her dreams the air dancers whispered *come come come join us come*

In the morning she dragged herself out of bed and dressed with one hand, clutching the crystal in the other, paying no attention to the unmade bed and ignoring the nightgown dropped on the

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floor when she stepped out of it.

She listened distantly as Habbibah described the cafta to be embroidered, took the ruled paper and went to her table to draw the designs.

Her fingers slipped into her pocket and moved slowly over the sensuous warm surface of the crystal.

Habbibah came scolding when she saw nothing on the paper.

Gleia looked at her vaguely, listened until the wizened little woman was done with her tirade, then bent over the paper. She began sketching flower forms under a single sun and dancing soaring butterfly figures, working the whole into a rhythm of lightness and joy.

Habbibah watched for a minute then went quietly away, smiling with greedy satisfaction.

Gleia went back to dreaming.

In her room that night she stripped off the cafta, hung it on a hook, and forgot it. Forgot to wash. Forgot to make her cha. She picked up the nightgown from the floor and slipped it over her head, ignoring its damp musty smell. She lay down on the wrinkled sheet turning the crystal over and over in her hands.

They came swooping around her, taking her through the line of houses perched on slender peeled sticks that raised them high above the flower-dotted moss below. Through open arches pointed at the tops. Past arches filled with knotted hanging accented with shell and polished seeds. Past walls bare and pearly grey, with brilliant hangings creating stripes of glowing color against their bareness. Over floors upholstered with padded carpets, different colors in different rooms. Through room on room on room separated from one another by cascades of multi-sized arches. Antennas clicking with laughter, the butterfly people darted about, showing off their homes.

come come they whispered to her *leave your miseries behind and ride the wind with us come come*

In the morning she dragged herself out of bed, put on the crumpled cafta from yesterday. Dressed with one hand again, not aware that her movements were limited by the warm and throbbing crystal clutched in her right hand. She thrust it finally in her pocket and left the room without washing herself or doing

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anything about the mess she left behind.

At work she sat hunched over the layout paper, running her pencil idly over the sketch from the day before, dreaming as idly of the crystal's world.

Habbibah came by sometime later and looked over her shoulder. When she saw the whole morning had gone by with nothing done, she exploded with rage. "Hai, worm!" she shrieked. Her small hand buried itself in Gleia's tangled hair and jerked her head up. "What're you sniffing, bonder?" She peered into Gleia's dull eyes. "By the Madar, I'll teach you to waste my money on that filth. Abbosine!"

The big tongueless watchman came from the small room where he spent his days. He took Gleia's hand, pulling her down the hall into the punish room. He pushed her against the wall and closed a set of cuffs about her wrists, her struggles as futile as fly tickles against his unthinking strength. He looked briefly at Habbibah. When she jerked her head at the door, he shambled dully out.

The furious little woman slammed her fist into Gleia's back, driving her against the wall. "You never learn," she hissed. "You never learn, bonder. Maybe I can't make you work, fool, but you'll hurt for it." She stepped back and swung the many tongued whip.

The sharkeskin tails slashed down, slicing through the worn cloth of the cafta, cutting lines of fire into Gleia's back. She gasped.

Grunting in a fury that showed no sign of abating, Habbibah lashed at Gleia again and again, screaming her rage at Gleia for all the times the girl had successfully defied her. For all the lovely coins the girl had milked from her. Finally, shaking, eyes bloodshot, face flushed, Habbibah dropped the bloody whip and walked out of the room with slow, dragging steps.

Gleia hung shuddering from her wrists, her legs too weak to support her weight. The crystal dream was cleaned out of her system by the pain that turned her body to mush.

Slowly she began to feel stronger, though, as the shock passed, the pain bit deeply into her. She pushed against the stone floor with stiff numb feet and took the punishing weight off her wrists. Standing face to the wall, she came to the humbling conclusion that she was a fool. To be trapped by a Ranga eye when she knew better. To be trapped by dreams like any giggling slogger's daughter. Dreams!

She felt the crystal press against her leg, sending warmth

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through the material of her cafta into her flesh. She jerked the leg back, feeling disgust at herself as she trembled with the memory of the beauty she'd seen in the eye, longing intensely, while at the same time shuddering with revulsion, for the freedom of soaring on air with the butterfly people of the dream. Somehow she felt they were real and not mere phantoms of a drugged mind. That their world was real. Somewhere. She couldn't comprehend how the crystal could serve as a gateway to that world, but deep within her she knew she could pass through the gate into a gentle world unlike the rough, unfeeling one she'd been born into. Ranga eye. Eye into another world.

"I'm not going to touch you again," she muttered, resting her forehead against the cold damp stone. "I'll sell you. I will. I'll find a way." The crystal bumped hard against her thigh, sending a stab of pain through her already aching body. "We'll see who wins once I get out of this."

Her feet began to ache since she couldn't rest fully on her heels. Her arms ached, stretching without respite over her head.

Fatigue and the effort of fighting off the insidious invasion of the crystal brought her close to fainting, while the growing certainty that Habbibah intended to leave her there all night, in a final attempt to break her spirit, was a cold knot in the pit of her stomach. She knew that if the old bitch did, the crystal would have her.

She smashed her hip against the wall, letting out a scream of anger and pain when the crystal ground into her muscle, striking hard against nerves. Sweating and breathing raggedly, she hung in the wrist cuffs, tears of pain streaming down her face, struggling to regain a measure of control of her body.

When she could think again, she shook her head. "No good," she muttered. She couldn't shatter it, maybe she could ease it out of her pocket.

Pinning the material against the stone she pressed herself to the wall, counting on the pain to keep the crystal from charming her. Wriggling, contorting her body until she was bathed in a film of sweat, she struggled to work the eye out of her pocket.

It fought back. Whenever she managed to squeeze it an inch or so from the bottom of the pocket, it wriggled like a thing alive and eeled away from the pressure.

She kept trying until she was exhausted, sick with pain, shaking too hard to control her body any longer.

It was dark in the room when Abbosine shambled back. The

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huge mute unfastened the cuffs and watched with massive indifference as she crumpled to the floor. Stolidly he wound his thick fingers in her hair and dragged her through the building and out into the alley where he dropped her in a heap beside the worker's entrance.

Gleia pushed herself onto her feet and stood swaying, supporting herself with a hand pressed against the side of the building. Then the anger that still simmered under the haze of fatigue gave her the strength to start walking over the cobblestones toward the main street.

She went to the wharf. Gritting her teeth against the pain she swung down onto the worn crossbar that was her only refuge at so many crises in her life.

Clouds sailed with clumsy grace over the darkening sky, tinged with a last touch of crimson though Horli had slid behind the horizon some time ago. Here and there a star glimmered in the patches of indigo sky visible between the cloud puffs. On the water the fog blew in thickening strands, coming up to curl around her feet.

The air had a nip that marked the decline of the summer. Winter coming, she thought. Three hundred days of winter. I've got to get away. Somehow. Get south. Her back itched and stung. The bruise on her thigh was an agony whenever she moved her legs.

But she was free from the eye and tomorrow she would be free of Habbibah too. She leaned tentatively against the pile, closing tired eyes once she was settled. Tomorrow. After the House of Records . . . what?

The water splashed and Tetaki was perched on the bar beside her. She jumped then winced as her back protested.

"What's wrong?" His mouth opened baring the tips of his teeth. His eyes searched her face, seeing the pain.

"I was stupid."

"Turn." His hand was cool on her arm. "Let me see."

She pulled back.

"Gleia."

"If you must." Holding onto the slanting brace, she swung around so he could see her back. With her face hidden, her forehead resting against the pile, she spoke too idly. "I told you. I was stupid! I knew better than to provoke her. Especially when she'd just had to pay me a bonus."

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His hand touched the lacerated flesh with exquisite gentleness. It still hurt. She sank her teeth into her lip to keep from crying out.

"Come wit' me."

"What?"

"To the ship. We got med'cine. Your skin's cut. 'Less wounds are clean you have trouble wit' them."

"I suppose so." She eased herself around. "Help me up."

He sat back on his heels, an odd look on his face. "Firs' time you ever ask for help."

She hauled herself to her feet and risked a crooked smile. "Give me a boost, friend."

On the ship, he nodded to the watch and took her below to his cabin. "Wait here. I get med'cine."

She sat on the narrow bunk and looked around with a quickly growing appreciation of the neatness, comfort, and convenience of the small cabin. A shelf of books running around the top of the wall, locked in place by an ingenious webbing. A desk folded away against the wall. A chair folded and latched flat. Two long chests. A shell lantern hanging from the beam bisecting the ceiling. The light coming through the translucent shell touched the room with rosy gold warmth. The oil was lightly perfumed with a pleasant fresh smell that made her think of forests and green growing things.

When Tetaki came back his father Temokeuu came with him. The older merman pushed gently on her shoulder, bending her over so he could see her back. "This isn't the firs' time."

"I learn hard."

"What lesson?"

"Submission."

"Hmm." He took the jar Tetaki was holding out. "This will hurt a little at first."

The salve stung like acid. She hissed in a breath and bit her lip till blood came, squeezed her eyes shut until tears came, then suddenly her back was cool and no more pain . . . ah . . . no more pain. She straightened and moved her shoulders. In spite of all of her expertise in enduring pain and degradation she felt uneasy now, having had little practice with kindness. She reached out and caught hold of his wrist with shaking fingers. "Th—thank you." She stumbled over the words. "Thank you," she repeated.

Temokeuu touched the brand on her face. "Bonded?"

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"Yes." She hesitated, stared in embarrassment at her scuffed and scarred feet in the old ragged sandals. "I was caught stealing."

"How long?"

"Since I was bonded? Six standard years. Three summers ago. A quarter of my life."

"To go?"

"Until whenever. The term was left open. It always is. Until I buy myself free, that's the sentence."

"Ah." There was heavy contempt in that soft breathed syllable. She looked up at him, startled. "How much is the bond?" he went on.

"Fifty oboloi. But you've got to add on the bribes. At least as much more. Say a hundred, hundred twenty oboloi."

He looked disconcerted. "So much?" Then he stroked a finger beside his mouth. "Never mind. How does one buy a bond?"

"Temokeuu, no. I can't accept that. Besides, I've earned the money already. I found I had a talent and the stubbornness to make it good." She caught his hand and held it against her cheek. "You're very good, you and Tetaki." She held out her other hand to the young merman. The she laughed, the sound surprising her with its joyousness. "I've got the money to buy the bond and pay the bribes." She stood and shook her hair back over her shoulders. Then she stretched and sighed, laughing more when one hand swung against the roof beam. "You're the only two people in the world I'd tell that to, my friends. It took the skin off my back to get that money but it was worth it. Tomorrow, Tetaki, Temokeuu. Tomorrow during my halfday I go to buy my bond."

He folded his arms across his wide chest. "I have some small influence."

She frowned. "I don't understand."

"I will stand for you in the court." He smiled suddenly, the shimmering tips of his opaline teeth barely visible behind his wide smooth lips, his dark green eyes glinting with a sardonic amusement. "It is surprising how much more alacritous justice becomes in the presence of influence."

She shifted uneasily, abruptly conscious of the smallness of the cabin, the closeness of the two seafolk males. "My debt becomes heavier by the minute. What can I say?"

Temokeuu's mouth twitched as he recognized her growing nervousness. He moved back and opened the door; as he stepped out he said, "When you are free, what will you do?"

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"I don't know. I thought about heading south."

"Come here." He felt her hesitation. "Think about it. I'll leave you to make your decision once we're finished at court, but there is always a place for you in my house." He went quickly up the steps of a ladder and swung out onto the deck.

Gleia scrambled up beside him and stood quietly waiting for Tetaki, enjoying the feel of the breeze fingering through her hair. "I'm a thief. Remember?"

"I owe you my son's life. Sin' that day you are blood of my blood." He chuckled, a warm affectionate sound. "A small dirty-face wild thing scolding me like my mother for letting my boy walk into danger." He touched her face. "I liked your spirit. That's why I let Tetaki spend so much time wit' you. You were good for him. Come wit' us. Be a daughter of my house."

"I don't want to be a . . . to live off anyone. I want to work my own way. To owe nobody nothing."

"What make you think any of the People are allowed to drift at another's expense?" He laughed. "Go back to your place, young Gleia. Rest. Here." He handed her the jar of ointment. "Put this on what you can reach in morning. I will wait beside the Hall of Records."

On the wharf again, she found the fog had closed in thickly. She could barely see the lanterns hanging from the mast. A muscle twitched in her thigh, reminding her of the Ranga eye. She shuddered. No, she thought, no more chances. It's too dangerous. I can damn well get along without it. She limped to the end of the wharf and pulled the crystal from her pocket. For a minute she hesitated as her fingers involuntarily caressed the smooth seductive surface. Was it so bad after all? Beautiful. The crystal throbbed and warmth began to climb up her hand. "No! Go charm a fish." She flung the eye out into the water.

The fog was bunchy and treacherous around the scavenger's hovels. She walked with intense wariness, moving silently along the rutted path. The last few meters she ran full-out, forgetting the pain in her leg as shadows came at her out of the dirty yellow-white muck. She slammed the door on the reaching hands and scurried up the stairs, flitting past Miggela's ambush before the ratty figure could come out and stop her.

She stood in the doorway wrinkling her nose at the unlovely mess waiting for her. Cursing the crystal under her breath, she lit a candle at the guttering tallow dip smelling up the hall, then

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marched inside, slamming the door after her. After bringing a measure of order in the chaos, she got out the brazier and the cha fixings, using the candle to light shreds of paper beneath the last of her charcoal sticks. While the water was heating she yawned and stretched, feeling amazingly good in spite of the incredible day behind her; then she pulled the cafta's ties loose and dragged it over her head. Once she had it off, she turned it over to look at the ruined back where the whip tails had sliced through the cloth. There was a weight sagging in the pocket.

She thrust her hand in and her fingers closed on a smooth curved form. Warmth leaped up her arms. Her hand came out. Came up. She couldn't open her fingers. The films of color danced around her, painted on the streamers of fog crawling through the open window. I threw it in the bay, she thought. I heard it splash. I felt it fly out of my fingers. I heard it splash. . . .

come come come come sister lover sister no more trouble no more pain we love and laugh and live in butter-rich sunlight there is no anger, no hate, no oppression here there is no anguish here there is no hurting we live in beauty no hunger no want no abandoned children we have as gift everything everything we want don't fight us come will it will it come you can come sunlight and beauty sunlight and joy come come sister lover

They were all around her, glorious wraiths twittering alluringly, antennas flicking encouragement, affection, love.

come sister come

The water tin began whistling, the small shrill sound cutting through the haze. She swung around, deliberately bashing her fist into the wall, the sudden pain breaking the spell. Holding the crystal in her sore hand, she ripped a piece of the slashed cloth from the ruined cafta and tied the thing in it. She hooked the rag over the handle of the wardrobe, breathing a sigh of relief as she walked across to the whistling tin.

At the House of Records, Gleia watched Temokeuu walk through the main entrance. He looked over his shoulder at her, his narrow face with its sharp angles throwing off glints of red

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and blue from the two suns, then he vanished through the door she had no right to enter. She sighed and pushed through the bonder's gate.

In the salla, body disciplined to the proper stance of humble submission, she stopped in front of the clerk's desk and waited for him to notice her.

"What do you want, bonder? Some pointless complaint? Be sure you don't waste my time." His fat arrogant face was creased in a frown meant to underline his importance. He fiddled impatiently with some papers sitting in a folder.

"By Thrim and Orik, the bonder's law," she said meekly. She fished in her pocket and pulled out a silver obol, laying it on the desk. "Thrim and Orik." She placed two more oboloi on tip of the first. "I come to buy my bond."

He grunted as he swept the coins off the top of the desk. "Straighten up, bonder. Let me see your mark."

She lifted her head.

"Closer. You think I can read the sign across the room?"

She leaned across the desk. He touched the brand. "Thief. That's fifty oboloi." His hand slid down her neck and moved inside the cafta, stroking the soft skin as he moved his pale tongue over his thick lips. "And an investigation to see if you've reformed. There's a lot of work in voiding a bond." He took a fold of her flesh between his fingers and pinched. She closed her eyes against the sudden pain. "Unless you can convince me now how reformed you are."

Gleia went stiff. She hadn't planned on paying that sort of bribe. If she refused him, he'd set a thousand niggling obstacles in her way until she exhausted her money and her strength and sank beaten back into the slow death of her bondage. She closed her eyes on her anger. If that was the cost, it was no big thing. Not when set against the thing she wanted. She thought of Abrahl. No big deal. She leaned into the fat clerk's hand, smiling at him.

He wobbled his pudgy body around to the gate and swung it open. "Interrogation room this way." As she moved through the gate, he shoved her along the hall and pushed her into a small bare room with a lumpy couch, a soiled chair, and a washstand.

Gleia pulled off her cafta and lay on the couch, waiting for him.

The Kadiff was sitting behind his high bench looking bored. He tapped long slim fingers on the desk top as the clerk led Gleia in.

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"What's this?"

"Bond buyer, noble Kadiff."

"Umph. Bring her here."

Gleia came to the desk, suppressing her annoyance at the servile behavior expected of her. She glanced quickly and secretly around as she bent her body into a low bow. Temokeuu came quietly from the shadows and stood beside her. The Kadiff raised his eyebrows and looked a trifle more interested.

"Noble and honored Kadiff, may I offer a small evidence of my appreciation for your Honor's condescending to disturb your magnificent thoughts to hear my small and unimportant petition?" She reached back and touched Temokeuu's arm, inviting him to share her game. His fingers touched hers, nipped one slightly, letting her know he was appreciating her performance.

The Kadiff inclined his head and she came closer, feigning a shy timidity, inwardly contemptuous of the man for swallowing her speech, sitting there, preening himself on his importance. She placed five gold pentoboloi on the table in front of him and backed away.

He grunted and tucked the coins into one of his sleeves. "You have investigated her reform?" he asked the clerk.

"Yes, Noble Kadiff."

The Kadiff sniffed. "No doubt. Have you sent for the bond holder?"

"Yes, Noble Kadiff. The caftamaker Habbibah. The wardman was sent and should be here momentarily."

"While we're waiting you'd better send for the brander. If we have to cancel the bond, he should be here."

"It will be done, Noble Kadiff." The clerk scurried out, looking pale at having forgotten this.

The Kadiff tapped the end of his long nose with a neatly polished nail. "It's unusual to see one of the seafolk in this place." He looked around disdainfully. "Let alone one of your status, ambassador."

Gleia's eyebrows rose involuntarily. A little influence he said?

Temokeuu bowed his head with a delicately exaggerated solemnity that delighted Gleia. "I owe blood debt to this person, noble sir, and stand surety for her. She is sister and daughter, blood of my blood."

The Kadiff appeared suitably impressed. His attitude altered subtly. He sat straighter, looked more interested, and considerably more respectful. "Fifty oboloi for the bond. You need ten more

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for the brander."

"I have it, Noble Kadiff." She kept her eyes on her feet.

"A lot of money. You're fortunate to have a sponsor, young woman."

Temokeuu bowed slightly. "The honor would have been mine, save that my daughter has earned the money to redeem herself."

"I didn't know sewing girls made such pay."

"If you please, Illustrious Kadiff, my designs have received some praise and brought much money into the pockets of Habbibah my bond mistress. And she has seen fit to share some of the bounty with me," Gleia murmured.

"Share!" Habbibah came storming into the room, the hapless wardman trailing behind. "The creature wouldn't work without extra pay. Why am I dragged out of my home? For this?" She jabbed a shaking finger at Gleia, then her hands went flying, touching her earrings, dabbing at her lips, brushing down over her chest. That and her angry lack of respect congealed the Kadiff's horseface into a scowl of petulant displeasure.

"Be quiet, woman." He glared at the wardman who hastily came up behind the angry Habbibah. "You are here," he went on, "as required by law to witness the cancelling of your bond."

"What!" Forgetting where she was, Habbibah shrieked and lunged at Gleia, small hands curved into claws. The wardman caught her and got a scratched face for his pains. He wrestled her back, holding her until the Kadiff's astonished roar broke through her rage, putting her on notice that she was in danger of a massive fine. The thought of losing money quieted her immediately. "I most humbly beg your pardon, Noble Kadiff," she shrilled, falling onto her knees in a position of submission. "It was only my anger at the ingratitude of this girl that made me forget myself. I gave her a home and trade and paid her well, better than she deserved, and now she wishes to leave me when the Maleeka herself has asked for her to work the cafta her daughter will wear on her nameday."

Gleia saw the Kadiff lean back, his eyes shifting uneasily between them. "May a lowly one have permission to speak, Magnificent Kadiff?"

"Granted." His eyes moved from the fuming Habbibah to the stern face of the merman. Like black bugs they oscillated back and forth as he tried to decide where his interest lay.

"The design is completed," Gleia said. She spoke slowly, clearly. "The design is the important thing. There are sewing girls with

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skills greater than mine to execute the work."

The Kadiff scowled at Habbibah. "Is that true?"

Habbibah glared furiously at Gleia but didn't quite dare lie. "It's true," she muttered.

"What?"

"It's true."

The Kadiff sighed with relief. "That, I believe, answers your objection, woman. And you, bonder, I hereby cancel your bond. The fifty oboloi, if you please."

Gleia stood in front of the wardrobe. Deliberately she unhooked the rag bundle and took it to the bed. She sat holding the bundle in her lap. "Well."

The crystal moved inside the cloth like something alive.

Rubbing the skin beside her new brand, Gleia contemplated the bundle. "Looks like I've got several ways I can go from here." She poked at the cloth, rolling the hidden eye about. "I can stay here and work for Habbibah. She knows I can quit any time and go with a competitor. I've got a lever now. Maybe could work out a good arrangement. At least I'd know what I was facing. I would, wouldn't I. I'd know what every day would be like. Every day." She shivered. "Or I could head south." She touched the stone and laughed. "And probably end up in a worse mess."

She rubbed the end of her nose, feeling warmth stroking down into her thighs from the stone. "I know what you want. Mm. I could go with Temokeuu and Tetaki. That's a leap in the dark too, but at least I'd have friends." She shook her head. "Some influence. Ambassador. Temokeuu, ah my friend."

Carefully, moving with slow deliberation, she untied the knots in the rag and touched the Ranga eye. The warmth spread up through her body and once again she saw the butterfly people. The male spun in ecstatic spirals and the others danced their jubilation. She could feel them drawing her out of her body. She wanted to let go, she wanted desperately to let go, to fly on glorious wings, free and joyous. So easy, it would be so easy just to go sailing away from all the pain and misery of her life here. Why not? Why not just go, let them take her to fly in joy under a butter-yellow sun. . . .

"No." She jabbed her free thumb into the new burn on her face, using the pain to wrench herself from the eye's influence. "No." She folded the rag about the stone, knotting the ends once again. Levering herself back on her feet, she took the bundle to the

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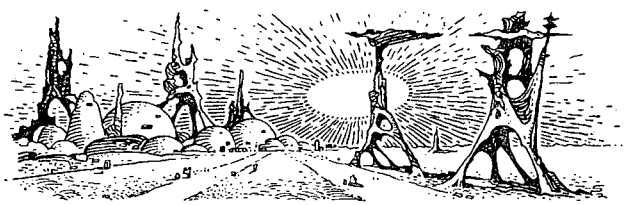
wardrobe, opened the door, and tossed the rag with the Ranga eye into the back corner. "No. You're too much like a trap. How could I trust you?" She shook her head. "I'm free now. I don't want you. I don't need you. What you offer is too easy. Makes me wonder where the thorns are."

Patting her pocket to make sure her money was safe, she went down the stairs for the last time, nodded pleasantly to Miggela as the squat figure came out of her nest. No reason to bother about the old rat any more. Gleia laughed to herself as she remembered dreams of telling her landlady just what she thought of her. But it wasn't worth the wasted energy.

She stepped into the cruelly bright afternoon, pulling the cafta's hood up over her head. Without hesitation she turned into the alley, leaving behind with few regrets the drab reality of her past and the dream possibilities of the crystal. Temokeuu was waiting, would wait until sundown for her answer. She smiled and began to run past the stinking hovels.



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Sirs:

Might I prevail upon you again to kindly send me directions for submitting stories to your magazine?

My baby chewed up the first set you sent.

Thanks.

Karen Adler
Brick Town NJ

Your baby has good taste. But fear not, there are plenty more of the directions.

—Isaac Asimov

These directions—a sheet on our story needs, and another sheet on manuscript format—are proving very useful not only to writers, who can thus find out what we want and how we want it prepared, but also to your editor, who is finding a greater number of stories he can use as a result.

—George H. Scithers

Dear Sirs:

Congratulations on a great magazine. Each issue seems to get better, and I have enjoyed them all. Your letter section especially pleases me, because it is not constantly filled with scientific theories, ideas, arguments, etc. Instead, you have chosen to print letters about your magazine, and what people think of it. To me, that is a sign of a magazine that cares about its readers, and what *they* want.

My main reason for writing this letter is to thank you for printing the memorial to Leigh Brackett Hamilton.

After the death of Edmund Hamilton I wrote Mrs. Hamilton my condolences. I was surprised—and much honored—to receive a letter from her, something that she didn't have to do. Her consideration of a fan who would miss her husband and his writing shows what a fine lady she was. Not only will she be badly missed, she will be remembered for a long, long time.

As I told her in my letter, her books and Edmund's will always

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be placed side-by-side on my bookshelf.

With much sadness,

Gus Gauba
Bisbee AZ

Well, if I may be serious for a moment, I have found science fiction writers to be warm and kindly people almost without exception. Perhaps it's because of the family feeling I mentioned in my editorial in the January-February, 1978, issue.

—Isaac Asimov

Dear Mr. Scithers:

To me, the single most impressive feature of your magazine is its encouragement of new writers. Since you already have a superstar in your title, you can avoid the "star system" in your choice of authors. Indeed, many of your outstanding stories have been first sales. It is good to know that the woods are full of talented young writers of all ages, for after all, who could be more youthful than The Good Graying Doctor?

I also enjoy Mr. Brown's book reviews, although I do wish he would include more reviews of a cautionary nature, such as he did with *Lucifer's Hammer*. Although I also enjoy the essay-reviews that appear in *F&SF*, I don't think such a style would fit your magazine. In fact, I would be twice as happy with Mr. Brown's reviews if he could find the time to review twice as many books.

Finally, many thanks for the Letters column. If these letters are representative of your readers, the column shows that they are bright, observant, and naturally optimistic—like the editors themselves.

Sincerely,

Richard D. Wright
Derby Line VT

The Good Graying Doctor? Hmm, that's nice. It will put the young ladies off their guard (I hope).

—Isaac Asimov

Dear Editorial Director:

Capital magazine! Why not a capital abbreviation—especially when it would make the grammar less grimmer? While "IA" appropriately denotes a capital person, "IA'sfm" suggests that

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person has a swelled head, and that's obviously not true. Anyone who has written over 200 books must have most of his neurons in his typing fingers.

See, for example, Andrew J. Offutt's (now, also a capital person) output in the July *Writer's Digest*. Your abbr. simply can't be—unless it's *Isaac Asimov's Fiction Magazine*. And please, please, not "IA'ssfm"! Plenty of precedents. . . before it went non-digital, "the one with rivets" was "ASF," and "F&SF" is still upppercase in our minds. Surely you don't want to appear as silly as those who advocate "stf" rather than steadfast "SF". . . spare us pinkie-strain on the shift key. . . "IASFM"!

Sincerely,

Dean R. Lambe
Vincent OH

How would you like to be me? I have to call it "the magazine" since I can't use my own name as if I am a stranger to myself.
—Isaac Asimov

DEAR MR. SCITHERS:

TYPING SURE IS EASIER AFTER ONE FINDS THAT THERE IS AVAILABLE A BALL FOR THE SELECTRIC THAT HAS NO LOWER CASE LETTERS, THEREBY ELIMINATING MY MAJOR SOURCE OF TYPING ERRORS! JUST FOR THE RECORD (DID I REALLY TYPE THAT?), THE THING IS CALLED "MANIFOLD". SURE DO LIKE IT.

I HAVE BEEN DELIGHTED WITH *IA'SFM* AND AM CURRENTLY ENJOYING THE NEW ADVENTURE ONE. SINCE I HATE LETTERS THAT PAINFULLY DISSECT THE ENTIRE ISSUE, I WILL ONLY SAY THAT I HAVEN'T ENJOYED AN SF MAGAZINE AS MUCH AS THESE SINCE I WAS ABOUT SIX, STEALING MY DAD'S COPIES, AND THEN HIDING TO READ THEM. (MY MOTHER WAS SURE THAT THEY WERE NOT SUITABLE FOR A YOUNG LADY!) IT IS SLIGHTLY DISTURBING TO REALIZE THAT I NOW HAVE A KID THAT STEALS AND READS *MY* COPIES! I REALLY WOULDN'T MIND, IF SHE'D JUST LET ME READ THEM FIRST, OR EVEN RETURN THEM. . .

BLESSINGS,

KATHIRENE N. PETERSON
HOUSTON TX

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My invariable suggestion under these conditions is that you buy two copies, one for yourself and one for that very intelligent kid of yours.

—Isaac Asimov

Our Associate Editor, Shawna McCarthy, suggests that I remind all of you would-be writers that we cannot accept manuscripts typed in all capital letters. The writer, not the typesetter, must decide which letters are to appear in the final, typeset copy in caps and which in lower case.

—George H. Scithers

Dear Dr. Asimov,

I have been subscribing to *IA'sfm* since about the third issue and enjoy it immensely. Since you do actively invite letters, (one of the features I appreciate), I do have a request: I'd like to see a monthly science fact article. I subscribe to three other SF mags, and in *F&SF* the first thing I inevitably turn to is your own good science fact article. In other magazines, Dr. Pournelle's column comes in a distant second to yours, and in the third I often find the science column much too technical or mathematical and I often can't wade through it.

Appreciatively,

Maria de Carlo
Paris, France

With all due respect to myself I honestly think it is better to wait for a good article than to lower standards by insisting on one monthly. Of course, if we happen to get twelve good ones a year—

—Isaac Asimov

Dear Mr. Asimov,

Having subscribed to your magazine, I began reading them (relatively) slowly. The first story I read was "A Delicate Shade of Kipney," and it got me permanently hooked. "Heretic in a Balloon" was the last straw—I am now an avid *IA'sfm* reader.

The following are my Top Ten stories for the first three issues I have received: 1) "Singularity" (Incidentally, this story was the second one ever to make me pull out the Kleenex—the first was "Flowers for Algernon") 2) "Heretic in a Balloon" 3) "A Delicate

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Shade of Kipney" 4) "The Far King" 5) "The Case of the Defective Doyles" 6) "The Third Dr. Moreau" 7) "Born Again" 8) "Panic" 9) "Darkside" 10) "The Voyage of the Bagel" (Come on, Dr. Gardner! That is the worst title I've ever heard!!!!!!!!!!!!!).

Keep up the good work,

Jon Zeigler
Salem OH

Imagine! Not one of my stories made the top ten. Talk about pulling out the Kleenex.

—Isaac Asimov

Dear Gentle Sirs:

I am writing this to tell you how wonderful your science fiction magazine is. I have every copy so far, but it is very hard to find here in Meridian MS. The only bookstore I have found it in doesn't always have it. But, I have managed so far to find each copy of your magazine.

I wish you both would put more puns into your magazine. I became acquainted with Dr. Asimov through his book, *I, Robot,* and since then have read most of his books and always delighted in the puns and humour of his stories.

Your latest issue (July-August) was by far the best one I have read. I especially liked Larry Niven's "Cautionary Tales", Michael Banks's "Horseless Carriage", Ginger Kaderabek's "Public Relations", and Diana Paxson's "Message to Myself."

Please—keep up the fantastic work! I hope you both will always be around!

Mr. Scithers, do you write, also?

Respectfully,

Anna Marie Robinson (Miss)

Now don't encourage George to write. I want his nose at the editorial grindstone.

—Isaac Asimov

Dear Dr. Asimov and Mr. Scithers:

Thank you for "Scrap from the Notebooks of Johann Wolfgang von Goethe". While it wasn't *exactly* a pun, it was close enough for me.

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Although I love your magazine, I have one complaint to make. The "letters" section runs about four issues behind. This (September-October, 1978) is the first time I've understood what the letters were talking about. (One wonders—what did you do for the first four issues . . . ?)

Sincerely,

Judy Anderson
Novato CA

We started letters with the second issue actually, but remember some letters are written late and if they're interesting, we publish them anyway.

—Isaac Asimov

Dear Mr. Scithers:

What, I ask you, is a near-penniless college student to do? When *IA'sfm* burst upon the SF scene a few years ago, I found that the contents greatly suited my tastes. So I bought it, and I have continued to buy it. Unfortunately, I also enjoy all of the other SF magazines, as well as an occasional novel. The reason that this is unfortunate is because, what with perpetually rising cover prices on both books and magazines, I simply cannot afford to buy all of the SF that I want to buy. And now you've complicated my life to a further degree by introducing *Asimov's SF Adventure Magazine*. You people are a threat to higher education. (Meaning that if much more good SF comes on the market, I won't be able to afford to go back to school this fall!)

On the other hand, the more magazines there are, the better the chances an unpublished writer such as myself has for making a sale. So I am enclosing a self-addressed, stamped envelope which I trust you will use to send me information concerning your story needs and preferences as to manuscript format. (Perhaps if I sold a few stories, I could afford to buy both *IA'sfm* and *AsfAm* . . .)

Sincerely yours,

Bradley Denton
Towanda KS

Comfort yourself with the thought that man does not live by bread alone—and maybe you can skip a few meals.

—Isaac Asimov

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Dear Mr. Scithers:

I have just finished the July-August issue of *IA'sfm* and I feel an urge to write a letter, something I don't usually do. I don't want to write a "Gee, wow, neato, that was a real keen issue . . ." But, God help me, that's what I feel like writing.

Why don't you print the addresses of the people who write the letters? Most SF magazines do this, and it makes it easy to contact people you agree or disagree with. Well, thanks for reading . . .

Jerry Witt
Sterling Heights MI

PS: Disregard the above idea if you have a member of your staff make those letters up and use fictional names. [*Does not apply; all the letters are real.—GHS*]

PPS: Hasn't anyone besides me noticed George Lucas's anachronisms in his first three movies? The first was *THX1138*. In *American Graffiti* the hot-rodder's license plate number was THX138. In *Star Wars* (at least the book), there was a Stormtrooper. Guess what his number was.

PPPS: Sorry about the PS; I get carried away.

The trouble is that some people may not want to be contacted. We would appreciate it if letter writers would indicate whether they are willing to have their addresses included. If you ARE willing, type your address under your name at the END of your letter. If you don't put your address at the end of the letter, we'll leave it out when we print your letter.

—Isaac Asimov

Dear Sirs:

By the way, my compliments on your last issue. As I expected, the editorial was good. I have just one minor complaint; why does the Good Doctor throw us words like "eupepsia"? Looking it up may well "develop my vocabulary," but it certainly wasn't in either of the two dictionaries I own! (Doesn't it just figure? They both included jawbreakers like "individualization" and "dehydrogenation.") In the end, I had to go down to the library to find out what it meant.

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The stories were up to their usual high standards, which caused me to hesitate. How could I possibly write anything comparable to Larry Niven's "Cautionary Tales"? Still, I suppose it can't hurt to try . . . can it?

I also enjoyed "Public Relations," by Ginger Kaderabek, and "One Rejection Too Many," Patricia Nurse's entry. I hope to see more of the stories of these writers in future issues.

I was fascinated by the article on your illustrator, Frank Kelly Freas. However, there are many other workers at your magazine, including presidents and managers; I hope you won't overlook them. How about doing their biographies in future issues?

I read Charles N. Brown's book reviews with interest. The only problem here is that I can never find the books he describes. I am, for instance, still looking for some of the novels he reviewed six months ago. It seems to take a long time for American books to work their way up here.

No such problem is evident in the distribution of your magazine, though. *IA'sfm* is always here, on or before the date it should be. Your sister publication, *AsfAm*, also has no difficulties in getting to Swift Current. *My compliments to your circulation department.*

Yours sincerely,

Julian A. Smith
Swift Current, Saskatchewan

If anyone else is puzzled, "eupepsia" means "good digestion." Its the opposite of dyspepsia. Your suggestion that we introduce the behind-the-scenes people is a terrific one. George, let's start by doing one on Joel. He'll blush, but who cares?

—Isaac Asimov

Dear Dr. Asimov:

I received my September-October issue a few days ago, and have a few comments to make about it. The lead story, "Softly Touch the Stranger's Mind," strikes me as an example of the kind of story that has been done to death over the years. No matter how well written, I think that there have been enough stories about aliens being forced to land on Earth and their first contact with humans. While the story was not particulary objectionable, I hardly think that it deserved the cover.

"The Bitter End" is one of the stories that I don't mind your

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breaking the rules over. While it is not science fiction, it is definitely good, and I think that you were justified in printing it.

"An Eye for Detail" is similar to many other stories on the quest for immortality, but the twist of ultimate loneliness is new; the only other mention of this that comes to mind is in Heinlein's *Time Enough for Love*. I think that the story was handled very well.

"Thirty Love," about a wonderful gift and the problems that it causes its owner, was excellent. Unlike Haldeman's earlier sports-SF stories, it emphasizes characterization instead of heavy-handed humor. His series is definitely improving with experience.

"The Victor Hours" seemed unoriginal and pointless. Reynold's first story, "Boarder Incident," was good since he retained a light touch. His second tried for a deep philosophical meaning and fell on its face.

"Inevitability Sphere" and its age-old conflict between the city slicker and outback roughneck was very good. Duntemann's first story takes an old theme and upgrades it into the future, but refrains from stereotyping the characters—a rare achievement.

I loved "The Adventure of the Global Traveler"! Any story that mixes science fiction, Shakespeare, and Sherlock Holmes (three of my favorite literary areas) and still retains some—dare I call it plausibility?—deserves whatever accolades available. Again, another excellent first sale.

I was disappointed in "Seasoning." Of course, I am unfamiliar with the rest of the series, but I expected a better story from Hal Clement.

Saving the best for last, I loudly applaud your editorial. Few things irritate me as much as a science fiction story with weak or outright wrong scientific backing. Not only does this ruin the story, but it puts faulty ideas about science into people's heads—such as the scare stories about nuclear power plants exploding that were popular in the 40's and 50's. Every aspiring science fiction author should be given a copy of this editorial.

Sincerely,

Stephen Fleming
Atlanta GA

It is very useful to have thoughtful comments on the stories, pointing up good and bad aspects. But remember that Heinlein's "Blowups Happen," the great exploding-nuclear-power-plant story,

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was written in 1940, before the fact.

—Isaac Asimov

We are always anxious to find out how well the magazine is being distributed to the newsstands in your neighborhood. The information in letters we've received already has been a great help to Mr. Gabree, our Newsstand Circulation Director, in trying to fix problems in this area. Some other things we're especially interested in:

If this is the first issue of the magazine you've read, what about the magazine got you to pick it up?

What is the lowest age at which people—in reasonable numbers—enjoy reading the magazine?

What do you think we can do to get more people to read the magazine regularly?

As always, letters are read by the editor, the publisher, the editorial director, and other people in Davis Publications, Inc., who have an interest in what a particular letter is about. Letters should be addressed to the editor at Box 13116, Philadelphia PA 19101. (This is also the address for sending in manuscripts, but before you do that, please send for our folders on our needs and on manuscript preparation. The address for new subscriptions, changes of address for established subscriptions, and problems with subscriptions is entirely different: IA'sfm, Box 1855 GPO, New York NY 10001.) While we always enjoy letters that say nice things about the magazine, sometimes letters that tell us what we're doing wrong and what we should do about it are more helpful. Either way, do write!

—George H. Scithers

NOTE FROM THE PUBLISHER

Due to mechanical difficulties with our printer, it has become impossible for us to continue to mail subscription copies of *IASFM* in wrappers. We are attempting to come up with a viable alternative.

—The Publisher

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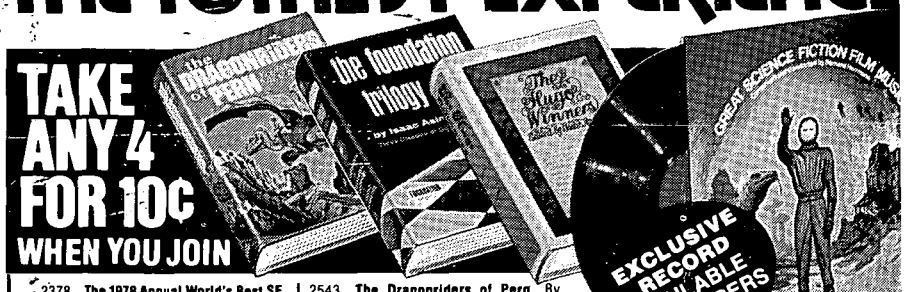
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